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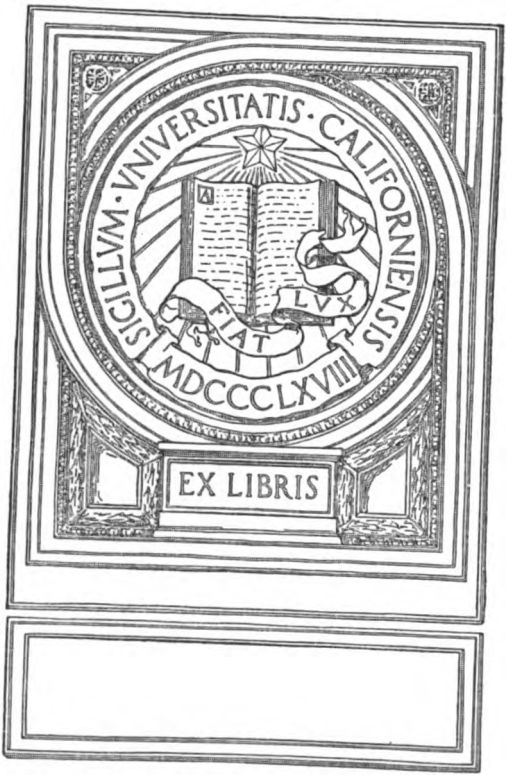
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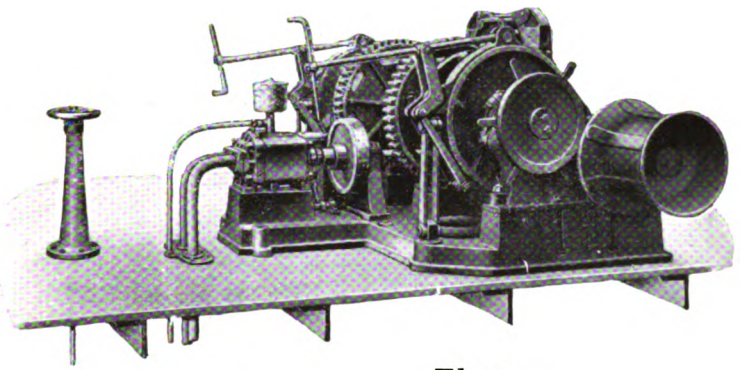
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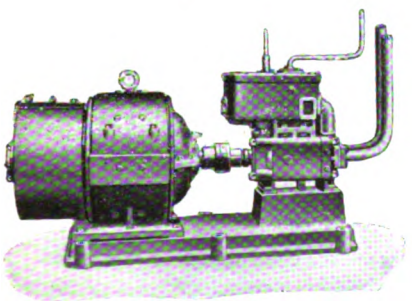
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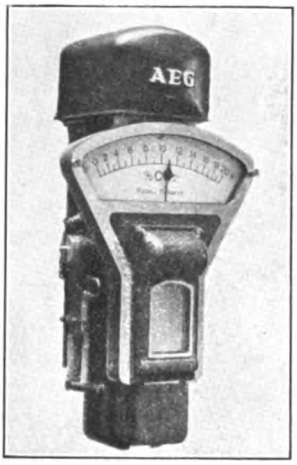
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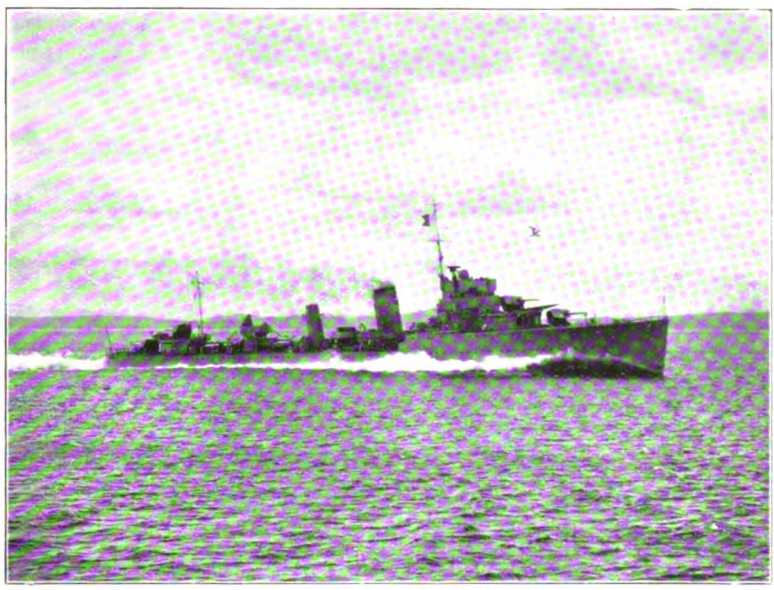
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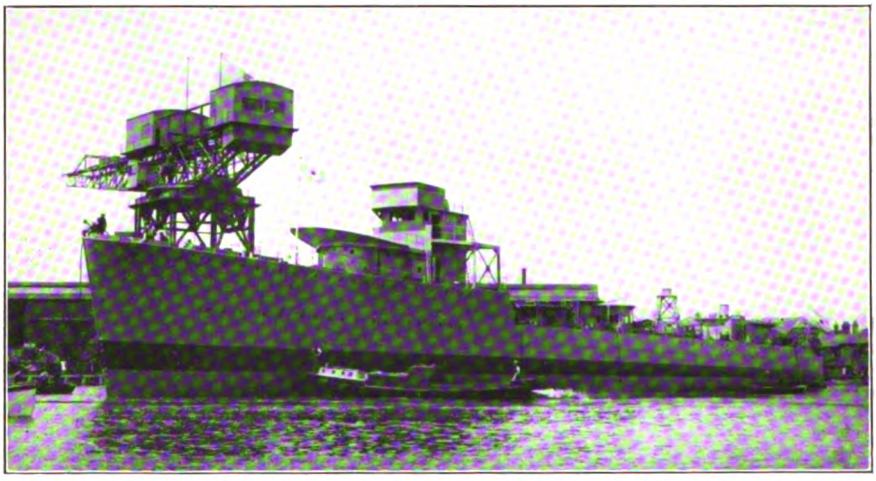
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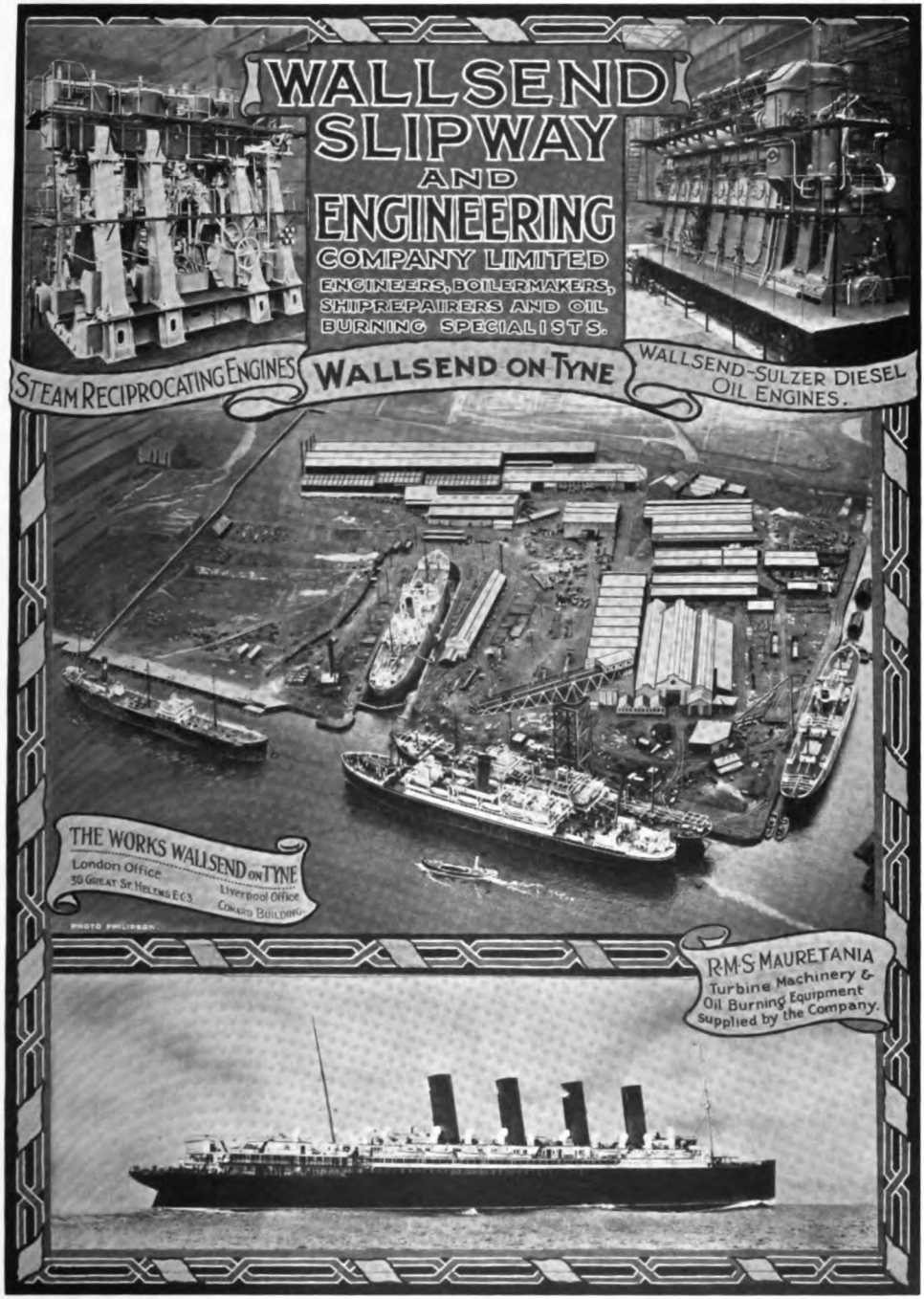
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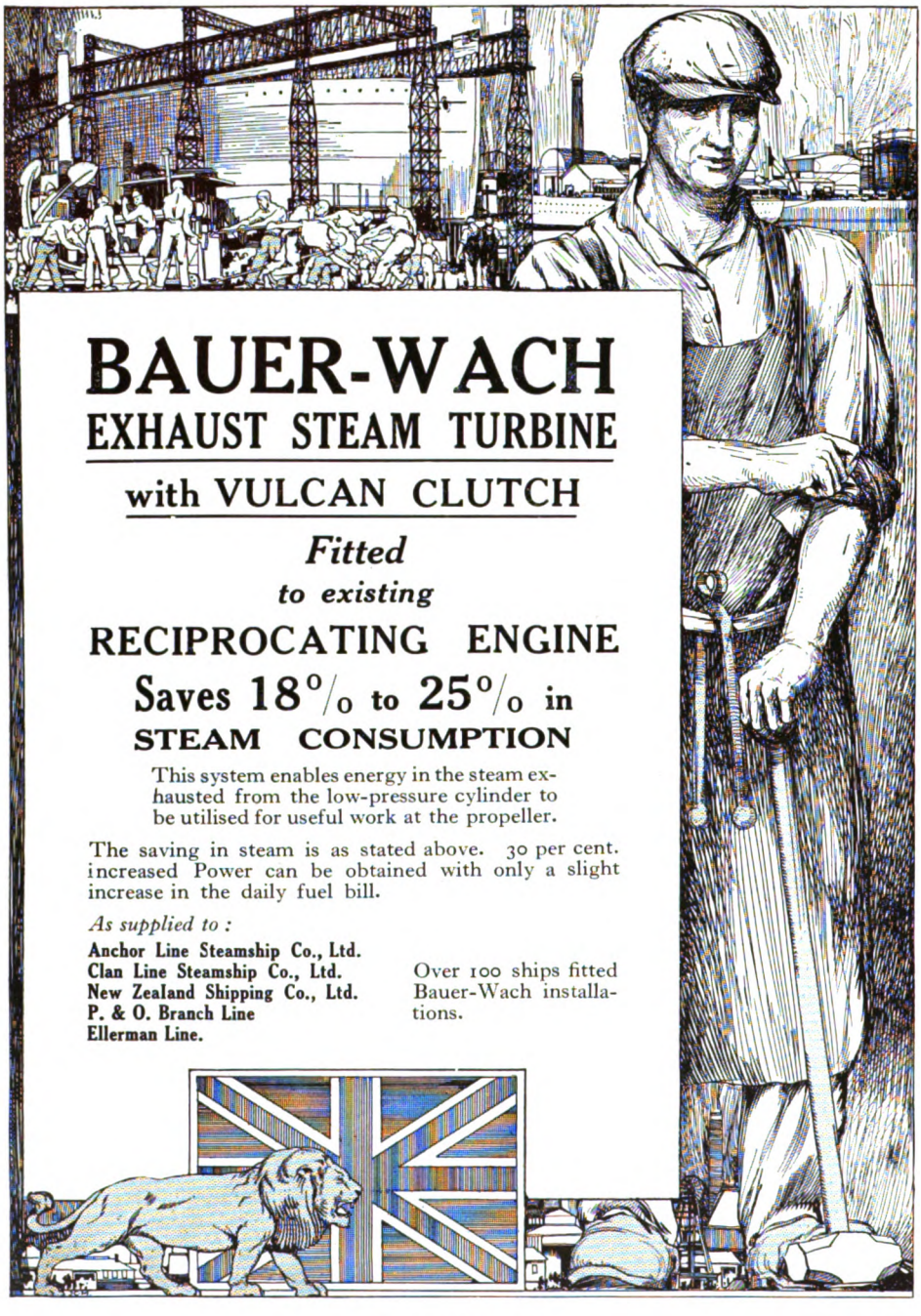
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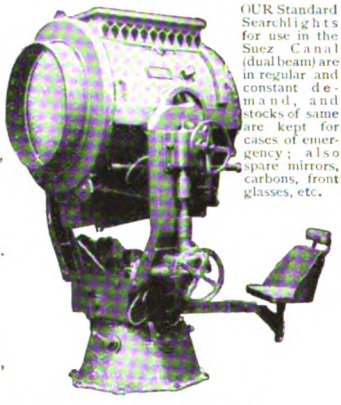
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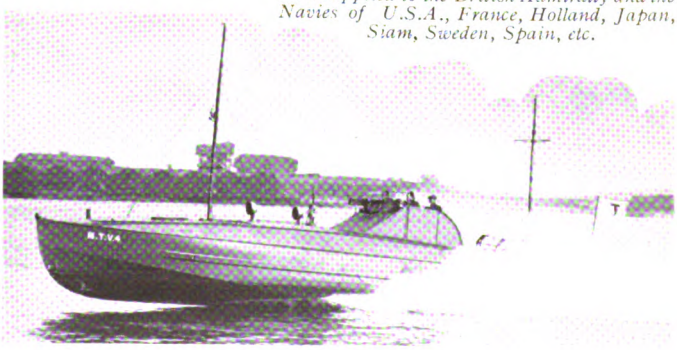


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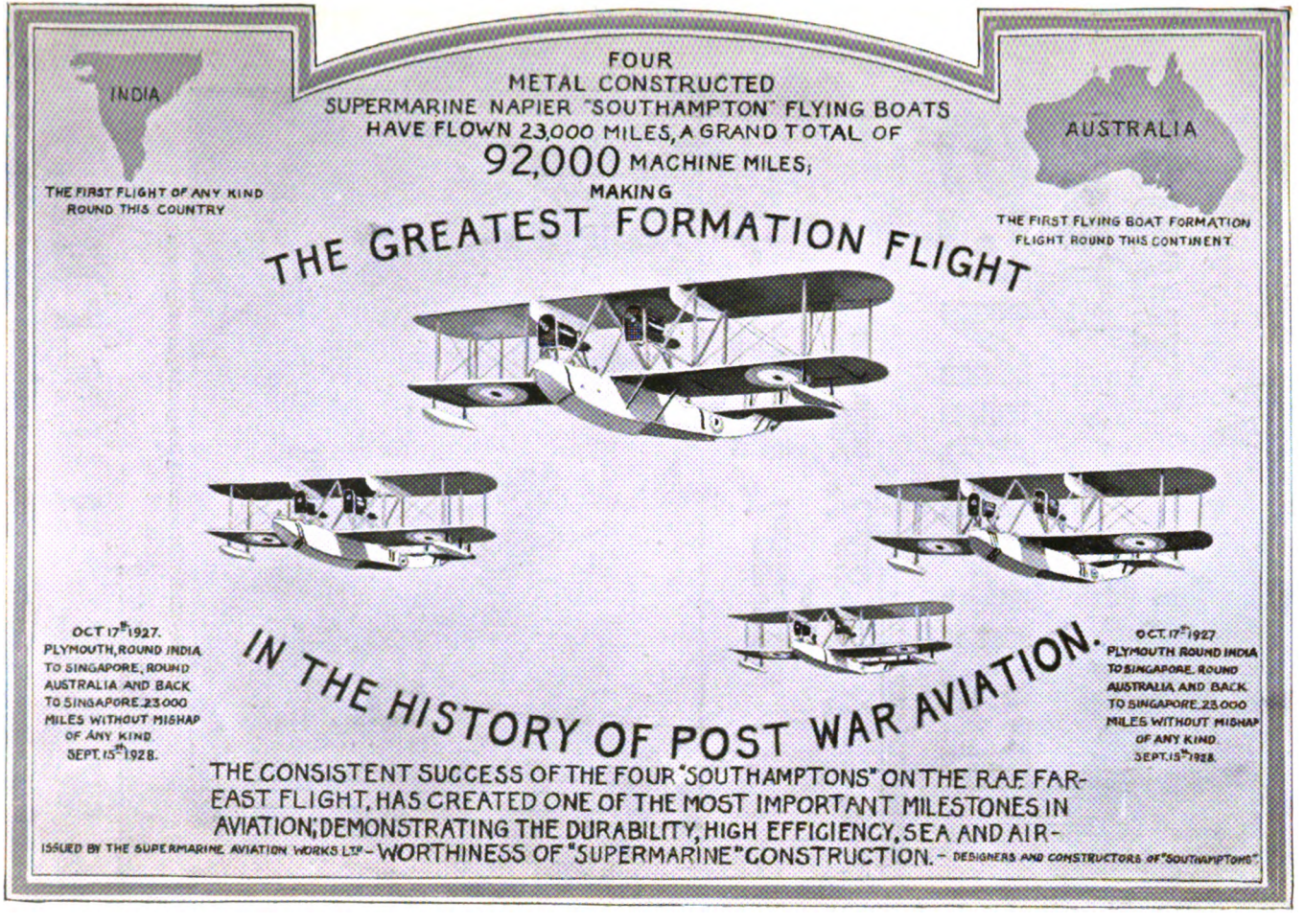
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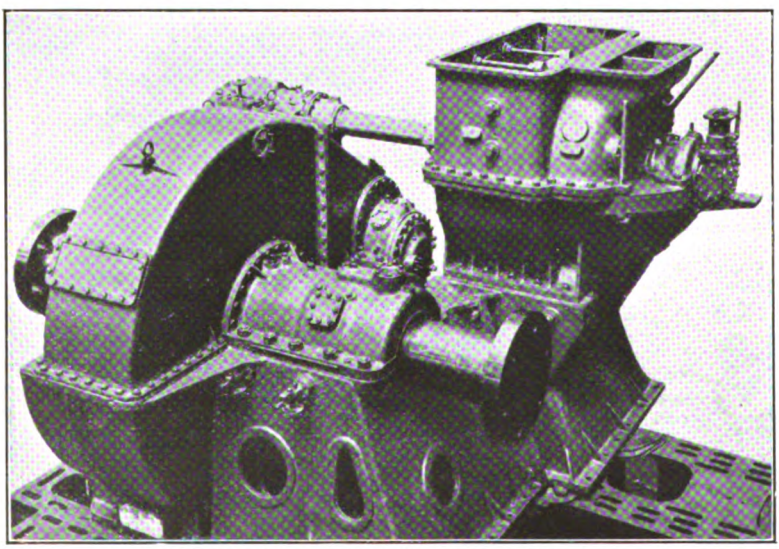
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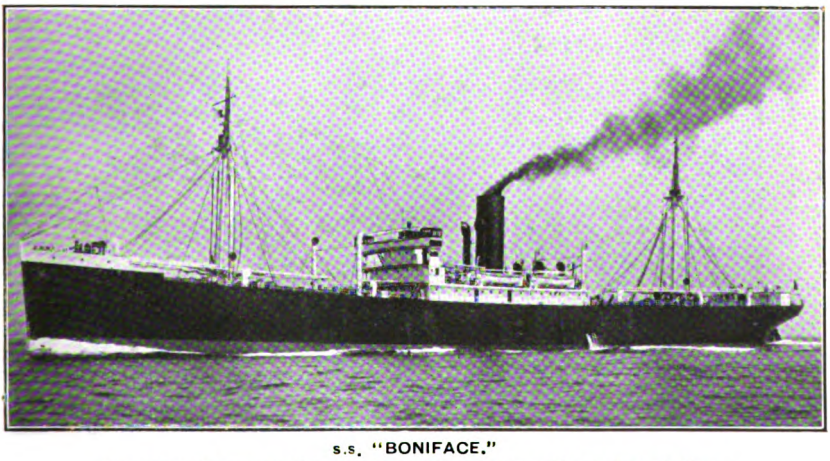
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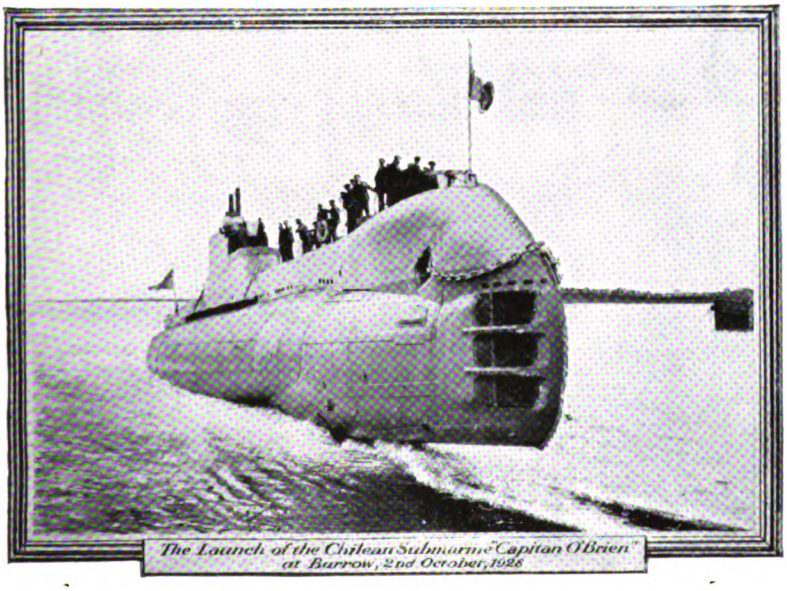
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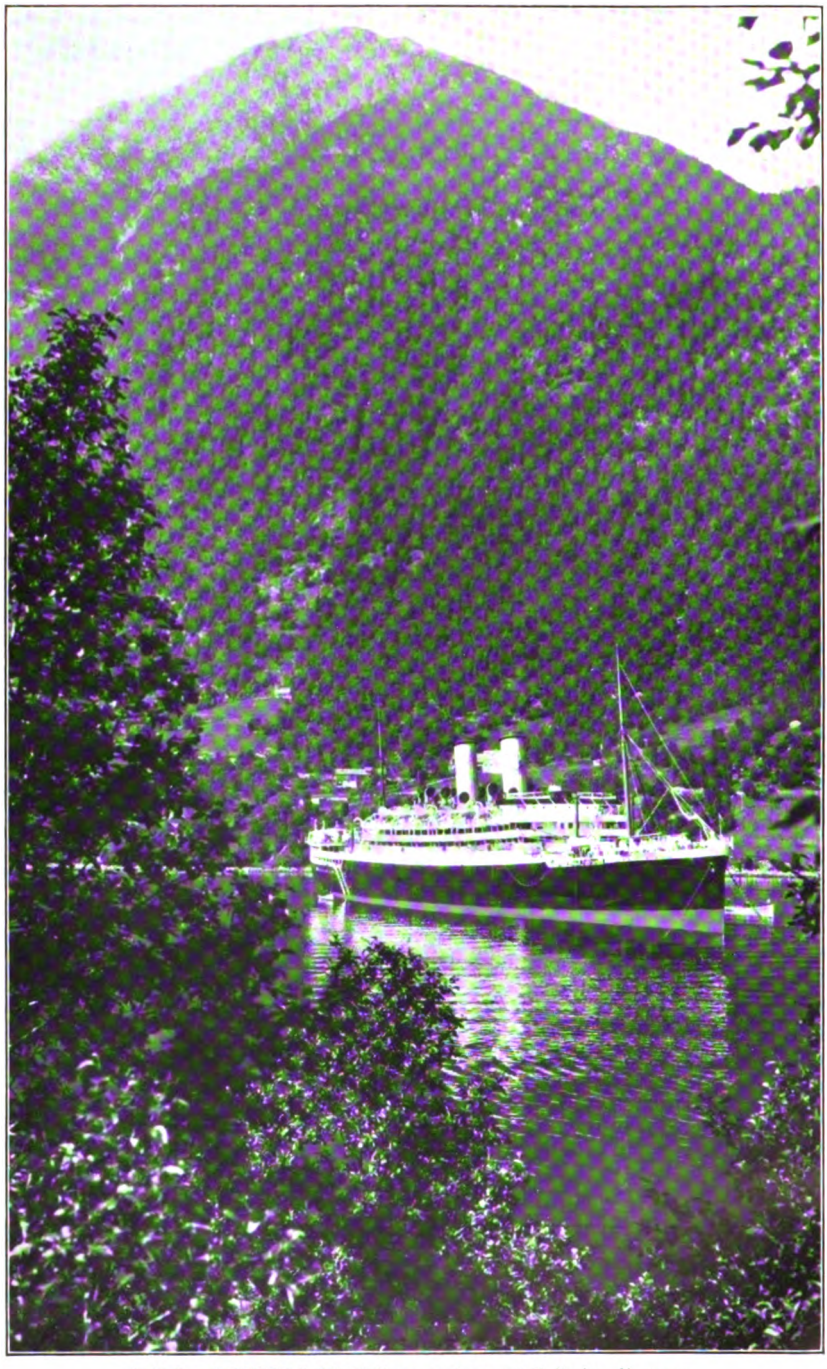
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PREFACE.

A SERIES of untoward happenings has contributed to delay the publication of this issue of "Brassey's Naval and Shipping Annual." In the circumstances, the sympathetic indulgence of its many friends will not be withheld.

After the sudden death of the second Earl Brassey in 1919, Sir Alexander Richardson, whose contributions had been welcomed and valued for some years previously, undertook the responsibility of carrying on the work, with the co-operation of Sir Archibald Hurd. A debt of gratitude is owing to these gentlemen, both of them lifelong students of naval affairs, for the manner in which, while adhering to the traditions of the "Annual," they enlarged its scope and interest, increasing very much its value as a record of maritime progress and an indispensable work of reference in regard to ships and shipping. Following a long illness, Sir Archibald Hurd decided to relinquish his connection with the "Annual" in December 1927.

Three months later, on March 30, 1928, Sir Alexander Richardson died in London at the age of 64. He had been in indifferent health for some years, but the end came rather suddenly. The control of the "Annual" then passed to Mr. James Richardson, B.Sc., who had been a regular contributor during his father's editorship, and whose special knowledge and experience of marine engineering made his co-operation of great value. He made arrangements in September for the continuance of the work on its former lines, and took charge of the Merchant Shipping Section. He was himself engaged on one of the chapters when he was stricken with illness, and died after an operation for appendicitis on February 6, 1929.

At the request of Lady Richardson and Mr. James Richardson, I had been asked, as having the longest association with the "Annual," to undertake the editorial supervision of the Naval Section of the 1929 issue. It is my pleasure to acknowledge the ready and prompt manner in which writers and artists whose names were already well known to readers and users of the "Annual" have continued their assistance. Certain delay was inevitable in the production of the volume, and in fairness to the authors of many of the essays it should be said that these were arranged for by Sir Alexander Richardson, and were finally passed by the writers early in December last.

Mr. Arthur J. W. Burgess again fills the position of Art Editor. Captain Edward Altham, C.B., Captain Alfred Dewar, O.B.E., Lieutenant-Commander A. Colquhoun Bell, and Major P. L. Holmes, D.S.C., R.A.F., will again be found as contributors to the Naval Section. Unfortunately, owing to the limited time available Sir

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George Thurston has been unable to contribute his usual chapter on an aspect of naval construction—a distinct loss which it is hoped to remedy next year. By way of compensation, however, a new writer, who prefers to remain anonymous, has supplied an illuminating survey of the developments in the machinery of warships since the war. Another writer whose contribution will be welcomed as breaking fresh ground is Commander A. L. Gwynne, C.B., R.N. On the important issues associated with United States and Japanese naval policies, the "Annual" has been fortunate to secure articles by officers of those countries whose competence to deal with their subjects will be generally recognised. Mr. H. H. Palmer, R.C.N.C., continues his valuable help in the revision of the tables and plans of warships. I am also indebted to Mr. G. H. Hurford, my Secretary, who for some twenty years has assisted in the compilation of certain sections of the "Annual," and who has this year undertaken the chapter on comparative naval strength, formerly supplied by the Editors.

In the Merchant Shipping Section, the writers whose names are already familiar to readers of the "Annual," and who are again represented, include Mr. John P. Taylor and Mr. Cuthbert Maughan. Two other writers retain their anonymity, "Scrutator" and "M.I.N.A." As new contributors, there are Sir William Seager, President of the Chamber of Shipping; Sir Halford Mackinder, Chairman of the Imperial Shipping Committee; Dr. Alfred H. Haag, of Georgetown University, U.S.A.; and Dr. Gustav Bauer, the joint patentee of the Bauer-Wach exhaust turbine system. In regard to the Merchant Shipping Section, the proofs of which I have read, I am indebted to Mr. W. H. Clapham, who was for some years a colleague of the late Sir Alexander Richardson, and who, in addition to his other work on the Merchant Shipping Section and the compilation of the Index, has supplied a chapter, as in earlier editions, on notable merchant ships of the year. I much appreciate his cordial co-operation.

CHAS. N. ROBINSON,
Commander, R.N.

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SUMMARY OF CONTENTS.

In the first chapter of the Naval Section, devoted as usual to a survey of the progress of the Naval Forces of the British Empire, there is noted the gain to efficiency by the completion of the first group of post-Washington cruisers, and by the development of the work of the Fleet Air Arm. The Dominions also gave evidence of the more virile part they are prepared to play in Empire defence, and in particular the Royal Australian Navy received an important accession of strength by the substitution of the Australia and Canberra for the Melbourne and Sydney and the Otway and Oxley for the two "E" class submarines lost in the War. On the other hand, the chapter records a marked slowing down in the execution of the 1925 schedule of shipbuilding. The evil effect of this will be felt when the war-built cruisers, destroyers, and other vessels approach their age limit in large batches from 1935 onwards. For some years past, the only public record of progress in British naval administration and organisation has been that to be found in this opening chapter of "Brassey."

The review of Foreign Navies is again contributed by Captain Edward Altham, C.B., who prefaces his record of progress by pointing out the difficulties which lie in the path of attempts to hasten the reduction of armaments by international agreement and decree. In his view, the only reason which might fairly be advanced by the United States for an increase of her naval strength would be the growth of her mercantile marine, which has, in fact, steadily declined in recent years. Will the American people foot the bill indefinitely for the indispensable subsidy for its maintenance? Light is thrown upon this question in later chapters. Rear-Admiral W. L. Rodgers, U.S.N., for instance, while admitting that the U.S. Shipping Board runs at a loss, considers that this is worth the cost to control rates. Captain Altham directs particular attention to the progress in the Navies of Spain and of Germany, as well as those of the South American Republics.

In dealing with the comparative strength and distribution of fleets, Mr. G. H. Hurford finds no evidence of rivalry in the limited amount of cruiser construction at present in hand. From and including the year 1918, Great Britain has laid down, or proposes to lay down up to 1929, a total of twenty-four cruisers, or an average of exactly two a year. The United States has laid down, or proposes to lay down, in the fourteen years from 1918 to 1931 inclusive, a total of thirty-three cruisers, or an average of nearly two and a half ships a year. Japan has been building regularly at the rate of two a year, and France and Italy have recently laid down one a year. The bare minimum which Great Britain ought always to be building for maintenance is at the rate of two and a half ships a year, as can

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be proved by a simple problem in arithmetic. Her minimum requirements in cruisers are fifty ships, and as the official age limit is twenty years, it follows that her entire cruiser force has to be rebuilt within that period. Actually, it is extremely doubtful whether many of the lightly-built war cruisers for home service will retain their utility for the allotted span. Certain it is that several of them will reach the obsolescent stage at the same time, and will become due for scrapping at a much quicker rate than that at which new ships are being passed into service.

In Chapter IV, Commander M. Niimi, Imperial Japanese Navy, in his observations on the naval policy of that country, makes the point, about which there should be no dispute, that, since the conditions in every country are different, quantitative parity does not always mean equal defensive power. He indicates that while Japan agreed to the ratio of 3–5–5 in regard to capital ships for herself, Britain, and the United States, such a proportion would be unacceptable to her in regard to the smaller classes of vessel, and in respect of them he asks for another 10 per cent. in the ratio ; *i.e.* 70 per cent. instead of 60 per cent., as compared with that of " the strongest Power in the world." A further problem which arises at this point is : Against which of the two nations at present sharing the position of strongest naval Power is the strength of Japan to be measured in the various classes ? Great Britain has a preponderance in cruisers over the United States, but in destroyers and submarines the United States is more than twice as strong as Great Britain. The Japanese cruiser total is about 66 per cent. of that of Great Britain, but roughly equivalent to that of the United States. Her destroyer total is about 80 per cent. of that of Great Britain, but only 40 per cent. of that of the United States.

Following the spokesman of Japan, the open forum which, in accordance with its tradition of over forty years, has always been maintained by " Brassey," is taken by Rear-Admiral W. L. Rodgers, U.S.N., to expound the viewpoint of the United States. It is ssentially a one-sided point of view, and strongly expressed, but that it should be placed on record is most desirable in the interests of good understanding between the Powers. The keynote would seem to be, American trade, at any price. An increased Navy is advocated on the ground of increased ocean commerce, not because any interruption to that commerce in case of war would threaten the country with starvation, as in the case of Great Britain.

There follows a painstaking and carefully-reasoned chapter by Captain Alfred C. Dewar, R.N., whose well-documented narrative will be found of great value for present use and future reference. He compares the concrete success in naval limitation achieved at the Washington Conference—where it was well said that Great Britain gave up her actual superiority and the United States gave up her potential superiority—with the difficulties which have beset the efforts to extend the compromise to other classes. There is a very good acid test in his remark that armaments would appear to be related in some degree to the probability of being attacked, and if there is no probability of being attacked, their *raison d'être* disappears.

The appreciable advances made since 1918 in the machinery of

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ships of war form the subject of a valuable chapter by an authority whose facts and comparisons will be studied with interest. He concludes with a reference to the remarkable design of the new German 10,000-ton armoured ship begun in 1928, a vessel midway between the battleship and the cruiser, intended to be able to elude the one by superior speed, and to be able to defeat the other by reason of a superior armament of 11-in. as compared with 8-in. guns. This design has been described as a challenge to the Powers. Battleship construction has ceased since the Washington Conference, and cruiser building was restricted thereat as to tonnage and calibre of principal gun. Germany thus has an opportunity to strike out a line of development on her own, while at the same time keeping within the provisions of the Treaty of Versailles, the possibilities of which seem to have been overlooked at Washington.

In Chapter VIII., Commander A. L. Gwynne, R.N., who served on the staff of the Mining Department of H.M.S. Vernon from 1914 to 1919, provides a detailed examination of the use and power of the submarine mine. His essay brings together a great deal of information not hitherto known, and outlines the future possibilities of mining in naval warfare. The special chart which accompanies it shows at a glance the extent of the North Sea minefields during the war, and incidentally indicates how thoroughly must the task of sweeping them up have been carried out during 1919.

Not since the "Annual" of 1920–21, when there was a chapter dealing with books on the naval aspect of the Great War, has an essay been devoted to contemporary naval literature. Lieutenant-Commander A. C. Bell, whose work is familiar to readers of the "Annual," has made good this omission in the present issue, and into a small space he has compressed a good deal of information which will assist naval officers and students. The growing importance of aviation as applied to marine purposes is again dealt with by Major P. L. Holmes. The past year has witnessed notable achievements both by the seaplanes and aeroplanes serving with the Fleet Air Arm, and also by the flying-boat units of the Royal Air Force. One of these is now based permanently on Singapore, after a most creditable long-distance voyage from England and round the coast of Australia; while another is to proceed to Basra for duty in the Persian Gulf.

The Shipping Section.

Shipping progress during the past ten years is reviewed in the opening chapter of the Mercantile Section by Mr. John P. Taylor, who shows how the quality of the merchant marine of the world has improved as an outcome of the fluctuations of the past decade, and how strong a position is held by Great Britain in this respect, with 23 per cent. of her ships under five years old. The decline in the relative positions of the United States and France, and the rise of Germany to fourth place, are features of particular interest. Intimately connected with the general shipping question is that of freight developments during 1928, which Mr. Cuthbert Maughan reviews in a lucid article. His concluding point about the sales of old British ships to foreigners is one of great importance to British shipping. That British owners should wish to keep their own fleets

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thoroughly up to date by building new and better ships is an admirable thing, but trouble begins when, instead of insisting on the breaking up of old vessels, these are sold to foreigners who can run them much more cheaply, owing to lower wages and the lack of British Board of Trade restrictions. The most effective way of preventing this would seem to be the creation of a healthy public opinion on the subject, and Mr. Maughan's article should help to do this.

A chapter is again devoted to the standing of the world's merchant fleets, and among the numerous facts to be gleaned from its statistics it may be learned that Britain, the U.S.A., and Japan, in the order named, again occupy the first three positions; that Germany, which was sixth, has come up to fourth place, overtaking Italy and France; that Norway, Holland, and Sweden come next in order of merit; and that Greece has improved her relative position from twelfth to tenth at the expense of Spain and Denmark. The rise of Germany is the most remarkable fact of this survey, for it is only eight years since she occupied the bottom place, with only small ships of less than 1,600 tons. Under the Peace Treaty she surrendered every vessel above this tonnage to the Allied and Associated Powers.

An authoritative opinion upon the world's shipping trade as a whole is given by Sir William Seager, the President of the Chamber of Shipping. To the question whether it is reviving, he is inclined to answer in the affirmative. While he notes that the volume of shipping is now 36 per cent. greater than in 1914, whereas the volume of trade is probably less than 10 per cent. greater, he points to certain hopeful factors, and has no doubt that an improvement is in sight. Sir Halford J. Mackinder, the Chairman of the Imperial Shipping Committee, supplies a lucid account of the labours of that body since it was set up in 1920, and shows how it could function as an umpire in the event of a conflict of interests between shipowners and shippers.

In view of the passing of the American Merchant Shipping Act of 1928, the review of the U.S. Merchant Marine, contributed by Professor Alfred Haag, of Georgetown University, is both timely and valuable. It is entirely a good thing to have set forth by such an authority the recent attitude in the United States towards its merchant marine. The underlying aim of the American people is represented to be "the combination of navy and merchant marine that totals sea-power." Whether the people realise the cost involved in the carrying out of such a policy, or the demands which it must make in the sphere of personnel, is another matter.

In the field of marine engineering, the past year has been specially full of progress and development, in spite of unfavourable economic conditions. Motor-ships continue to make great headway, and progress would appear to be more rapid in this respect in the Merchant Navy than in the Royal Navy, where Diesel engines have yet to be fitted in a regular cruiser. In the chapter on "Marine Machinery," the writer considers the greatest development of the year to be the large number of steamers which are having the Bauer-Wach exhaust steam turbine plant fitted. A special chapter on this new plant by Dr. Bauer, the joint patentee of the invention, is included in this issue, and will command wide attention.

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NAVAL SECTION.

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By courtesy of the builders, Vickers-Armstrongs, Ltd.)

LAUNCH OF THE CAPITAN O'BRIEN, FIRST POST-WAR SUBMARINE FOR THE CHILEAN NAVY.

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CHAPTER I.

Naval Forces of the British Empire.

The close of 1928 found in the Royal Navy unmistakable signs of improvement and progress. Internationally, the horizon was much clouded with doubt and suspicion, rendering futile all efforts to arrive at common ground for measures for the limitation of naval armaments. The unfriendly reception in the United States of the Anglo-French agreement emphasised the difficulties in regard to arranging for that parity in naval strength which has been accepted in principle. The needs of the Powers in matters of sea defence vary greatly, and are not easy to reconcile with mathematical formulæ. But there was a hopeful note in the reply of the U.S. Government that the door was left open for future discussions.

In regard to material, the Fleet received into service the new battleships Nelson and Rodney, which had been completed during 1927, and the performances of which gave satisfaction. The year also saw the fruition of the Labour Government's programme of 1924 of five cruisers and two destroyers. The cruisers, of the Kent class, were the first of 10,000 tons and 8-in. guns. They proceeded to the China Station, adding greatly to the prestige and power of the cruiser squadron in those waters. The destroyers, Amazon and Ambuscade, carried out a four months' independent cruise around South America, demonstrating their sea-keeping and steaming qualities in a satisfactory manner. The Dominions also shared in the material progress of 1928, Australia taking delivery of her two new cruisers and two new submarines, while Canada entered the market for the construction of two destroyers.

The Fleet Air Arm was able to put in more training by the addition of the new carrier Courageous, increasing the number of such vessels in sea-going commission from four to five, and the aggregate tonnage from 70,350 to 88,950. These figures are exclusive of the obsolete and small aircraft carriers Pegasus and Ark Royal. At places as far apart as the north of Scotland and the disturbed ports on the Yangtse, naval machines have been seen in greater numbers than in any other year since the Fleet Air Arm was formed on its present basis in 1923. No important change in the distribution of ships occurred during the year, but the placing, after long delays, of the contract for the new dockyard at Singapore foreshadowed the presence of capital ships on the China Station in years to come.

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I. THE BRITISH NAVY.

Reduced Construction Programme.

Two important departures from the policy in regard to new construction approved by the Cabinet in July 1925, and recorded in the "Annual" of 1926, have been made during the past year. Certain ships have been struck out of the building schedule; and the dates for laying down several of those remaining in the schedule have been postponed. Not only is the five-year programme smaller, but it is being retarded in its execution. The effect of this is that the Fleet will receive in the years which lie immediately ahead fewer new vessels for replacement purposes, and will receive them at later dates, both of which must have an unfortunate effect upon efficiency and upon the training of officers and men in new types. This sacrifice may be set down as yet another contribution by Great Britain in the interests of world peace, although whether it will have as wholesome an influence in this direction as the maintenance of an adequate and up-to-date Fleet is open to question. That battleships should be reduced in numbers and tonnage by international agreement is all to the good, but it is different with cruisers required for the protection of sea communications and food supplies.

Up to the time of writing, three cruisers have been deleted from the five-year programme. The quota for the financial year 1927–28 was three ships, two in the dockyards and one by contract. On November 16, 1927, Mr. Bridgeman announced in the House of Commons, in reply to a question, that the Government had decided, in the light of the situation disclosed at the recent Geneva Naval Conference, that it was not necessary or desirable to proceed with the laying down of two of these ships. Only one ship, of the smaller or "B" type, was proceeded with. Two months later, on January 20, 1928, it was officially announced that the Cabinet had completed a review of the new construction programme for the years 1927–29, and had decided that, in addition to the deletion of two cruisers of the 1927–28 Navy Estimates, the programme of 1925 should be further modified by omitting one of the three cruisers intended to be begun in the financial year 1928–29. The reference to the Geneva Conference gave rise to certain misgiving, seeing that the Conference failed in its purpose. Even had it succeeded, and had the three leading Powers agreed to limit or reduce the building of new cruisers, the result would have been difficult to justify in the light of our heavier responsibilities. But when other nations are free to provide that measure of trade protection which they deem essential, it is unfortunate that a programme drawn up with such care as that of 1925, which was purely one of replacement, and which had no element of competition about it, should be tampered with. The Navy League, in a manifesto dated November 17, 1927, summed up the position when it said that "these new cruisers are urgently required to replace worn-out and obsolete vessels, and the effect of the Government decision to delay or cancel them will be to cause a

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shortage of up-to-date cruisers in a few years' time, when they might be urgently needed, and so to jeopardise our sea communications. The decision will also have the effect which has always resulted in the past from the abandonment of programmes of naval replacement—namely, a hurried emergency building programme in the future, when the country suddenly realises our danger. Such scare programmes are more expensive and less efficient than a steady and sustained scheme such as that which has just been abandoned."

The further the programme has been proceeded with, the less money has been voted for it. New construction in the 1928 Estimates cost £8,510,701, as against £9,047,146 in 1927, a reduction of over half a million. In 1924, to start building five cruisers and two destroyers, £1,770,938 was voted. In 1928, to start building two cruisers, a flotilla leader, eight destroyers, six submarines, four sloops, a submarine depot ship, and a gunboat, only £11,914 was allocated. In fact, the sloops, submarine depot ship and gunboat had no money allotted to them—their inclusion in the Estimates was meaningless.

The Nelson and Rodney.

Since the last "Annual" appeared, the Nelson and Rodney, most powerful of their type in the world, and, with the exception of the West Virginia in the United States Navy, the only battleships laid down for any nation since peace was proclaimed, have been passed into service. The Nelson was commissioned at Portsmouth on August 15, 1927, and on October 21 (the anniversary of Trafalgar) she hoisted the flag of Vice-Admiral the Hon. Sir Hubert Brand, Commander-in-Chief, Atlantic Fleet, in succession to the Revenge. The Rodney was commissioned at Devonport on December 7, 1927, and in the following February went to Portland to await the return of the Atlantic Fleet from its spring cruise. The Nelson and Rodney were both in the Fleet which was seen at evolutions off Portland on April 3, 1928, by King Amanullah of Afghanistan. Both vessels were very successful on their trials, and proved themselves economical steamers at all speeds. On her eight hours' full power trial the Nelson developed a shaft horse-power of 46,000 with no undue forcing. The mean speed developed throughout this trial was 23½ knots. Her manœuvring trials were also completely satisfactory. Further details revealed since the last issue of the "Annual" serve to emphasise the power, utility and war-worthiness of the Nelson design. An important change made is in the method of gun disposition. The nine 16-in. guns are in three triple turrets, placed as close together as is practicable, on the middle line of the ship forward, coming before the control tower, funnel and mast. The second of the three turrets is raised so that its guns can fire over the first, but while there is thus an ahead fire of six guns, none of the 16-in. guns can fire directly astern. The new method of disposition is understood to be advantageous from the point of view of protection, as a less weight of armour suffices to afford protection to the magazines when they are placed nearer together. Gunnery control,

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too, is facilitated when the heavy armament is concentrated in a smaller area of the ship. The following figures show the greater efficiency of the propelling machinery. As compared with the Revenge, completed in 1916, the Nelson is heavier by 9,250 tons, or 35 per cent. Her speed is the same (23 knots), but the horse-power required to attain it shows an increase of only 5,000, from 40,000 to 45,000 or 12½ per cent. The Revenge has direct-drive turbines, while in the Nelson the turbines are geared. At full speed the Nelson burns only 16 tons of oil an hour, whereas the Revenge burns 23 tons; and at cruising speed the consumption is only 2·7 tons an hour, as compared with 5 tons in the Revenge.

If it comes about that the Nelson and Rodney, as some think, are the last battleships which will ever be built, they will at any rate represent a wonderful testimony to British engineering and shipbuilding prowess. Their design and equipment are quite unlike anything which had gone before, and there is a certain fitness in the course of world politics which allowed British naval architects and marine engineers to exercise their talent and ingenuity once after the war upon the production of such fine vessels.

"County" Class Cruisers.

All five cruisers of the "County" class which were authorised in 1924 have been passed into service during the past year. Dates are as follow:—

	Laid Down.	Launched.	Trials Begun.	Left for Overseas.
Berwick	15/9/24	30/3/26	12/7/27	3/3/28
Cornwall	9/10/24	11/3/26	6/12/27	12/5/28
Cumberland	18/10/24	16/3/26	18/9/27	26/1/28
Kent	15/11/24	16/3/26	12/4/28	5/7/28
Suffolk	30/9/24	16/2/26	21/9/27	1/6/28

It will be seen from the above that the periods from the laying of the keelplate until the date of departure from England for foreign service varied from three years, three months, in the case of the Cumberland, built at Barrow by Messrs. Vickers, to three years, eight months, in the cases of the Suffolk and Kent, built at Portsmouth and Chatham Dockyards. The average time was about 3½ years. This is of interest from the standpoint of international policy, for when the period of six months between authorisation and laying down is added, it means that at least four years elapse between the time when the House of Commons approves the building of a 10,000-ton cruiser and the time when that ship is ready to take her place in the Fleet. The period tends to increase, moreover, as since 1925 it has not been the practice to lay down ships in the same year as that in which they are authorised. The vessels of the 1925 programme, four in number, were postponed, two until the spring of 1926 and two until the spring of 1927. The three ships of the 1926 programme were laid down between May and September 1927.

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The one ship of the revised 1927 programme was not begun until August 1928; and the two ships of the 1928 programme cannot be laid down, owing to lack of financial provision, until well into 1929. In this manner, and according to the rate of building set by the five ships of the Berwick class, about five years must be allowed from the appearance of a ship in the Navy Estimates and the date of her final completion.

The 10,000 tons of the Kent class represents the "standard" displacement, without fuel and stores; at deep load the displacement is 13,630 tons. A comparison with the original "County" cruisers of about 1901 reveals many points of interest. The extreme length of the new ships is 630 ft., as compared with 463½ ft. The beam is 68 ft. 4 in., as compared with 66 ft. The mean draught is only 16¼ ft., as against 23¾ ft. Reciprocating engines driving two shafts in the old type have given place to geared turbines driving four shafts; the horse-power has increased from 22,000 to 80,000; and the corresponding designed speed from 23 to 31½ knots. Instead of 1,730 tons of coal, the new cruisers can carry 3,200 tons of oil. An important difference is in regard to radius of action. At full speed, the radius of the old "County" class was 2,020 miles, and that of the new is 2,300 miles; but a great improvement is apparent at economical speed. Whereas the older vessels were only good for 5,600 miles at 10 knots, the new, at from 11 to 14 knots, are capable of 10,400 miles; in other words, they could go from Portsmouth to Hong Kong, or from Hong Kong to Valparaiso, without having occasion to refuel. There are also advances to note in offensive power. Not only are all the eight 8-in. guns mounted in turrets, but the rate of fire and method of control is much improved. Flash protection is provided, and there is greater security for those handling the guns and ammunition. The torpedo armament is placed above water and amidships, instead of being forward and submerged.

The "London" Class.

The four cruisers of the 1925–26 Estimates have been put afloat since the last "Annual." The London at Portsmouth was launched on September 14, 1927, when the Lady Mayoress of London, Lady Blades, performed the naming ceremony. The Devonshire, at Devonport, was launched on October 22, 1927, by Lady Mildmay of Flete. The Sussex, at the yard of Messrs. Hawthorn Leslie and Co., Ltd., was launched on February 22, 1928, by Lady Leconfield; and the Shropshire, at the works of Messrs. Beardmore and Co., Ltd., took the water on July 5, 1928, when the naming ceremony was performed by Lady Powis. The "London" class have been allocated for service in the First Cruiser Squadron, Mediterranean. The principal differences which are apparent in their design and that of the "Suffolks" are a reduction of 2 ft. 4 in. in beam, an increase in draught, and an increase in designed speed to 22¼ knots.

In the 1926–27 programme, there were three ships, two of the "A" or 10,000-ton class, the Dorsetshire and Norfolk; and one of the "B" or 8,400-ton class, the York. The last-named took the

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water first, being put afloat by H.R.H. the Duchess of York at the yard of the Palmer's Shipbuilding and Iron Company, Jarrow-on-Tyne, on July 17, 1928. The policy of building a smaller class of cruiser simultaneously with those of the 10,000-ton class has aroused some adverse comment. It may be regarded partly as an experiment, to see whether there is any response on the part of other countries in the direction of smaller dimensions for cruisers for trade protection. Manifestly, it would be wasteful to build 10,000-ton ships armed with eight 8-in. guns if 8,400-ton ships, armed with six 8-in. guns, were capable of doing the work, but there is much virtue in an "if," and it can hardly be held that the smaller class are adequate for their task so long as there is a possibility of their being pitted against larger and better armed vessels. The York has a length of 575 ft., as compared with 595 ft. in the 10,000-ton class, and a breadth of 57 ft., as compared with 66 ft.

With the departure of building a new type of 8,400-ton cruisers, it was also decided to give them a different class of name, and therefore it was decided to call them after cathedral cities of Great Britain. Hence the name York, instead of Yorkshire. The second of the class will be the Exeter, authorised in the 1927–28 programme. The first keel-plate of this ship was laid at Devonport Dockyard on August 1, 1928, by Lady Bentinck, wife of the Commander-in-Chief.

New Destroyers.

The first group of destroyers in the replacement programme was allocated for authorisation in the financial year 1927–28. Contracts for all but one of these were placed in February 1928, and for the remaining vessel in May 1928, the full list being as follows: Flotilla leader Codrington, Messrs. Swan Hunter and Wigham Richardson, Ltd., Wallsend-on-Tyne with machinery by the Wallsend Slipway and Engineering Co.; destroyers Acasta and Achates, hull and machinery by Messrs. John Brown and Co., Clydebank; destroyers Active and Antelope, hull and machinery by Messrs. Hawthorn Leslie and Co., Hebburn-on-Tyne; destroyers Anthony and Ardent, hull and machinery by Messrs. Scott's Shipbuilding and Engineering Co., Greenock; destroyer Arrow, hull and machinery by Messrs. Vickers-Armstrongs, Ltd., Barrow-in-Furness; destroyer Acheron, hull by Messrs. Thornycroft and Co., Woolston and machinery by the Parsons Marine Steam Turbine Co., Wallsend-on-Tyne. A total expenditure of £1,002,713 is provided for these nine vessels up to March 31, 1929.

Submarines Launched.

The replacement of submarines was scheduled to begin a year earlier than that of destroyers, and provision for six vessels was taken in the financial year 1926–27. These six were brought to the launching stage during 1928. The Odin, laid down at Chatham Dockyard in June 1927, was launched on May 5 by Mrs. A. J. B.

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Stirling, wife of the Admiral-Superintendent of the Dockyard. Three submarines of the group were ordered from Messrs. Vickers-Armstrongs, Ltd., at Barrow, and these were launched, the Osiris on May 19, 1928, by Lady Dixon, wife of the Engineer-in-Chief of the Fleet; the Oswald on June 19, by Mrs. Layton, wife of Captain Geoffrey Layton, D.S.O., R.N.; and the Otus on August 31, by Mrs. Grace, wife of the Rear-Admiral of Submarines, Rear-Admiral H. E. Grace, C.B. The Otus brought the total number of submarines launched at Barrow-in-Furness to 149. The other two vessels were ordered from Messrs. Beardmore and Co., Ltd., Dalmuir, and named the Olympus and the Orpheus.

The 1927–28 programme also included six submarines, contracts for which were placed in February 1928. Four of the vessels are being built by Messrs. Vickers-Armstrongs, Ltd., at Barrow-in-Furness, to be named the Perseus, Poseidon, Proteus and Pandora; one by Messrs. Cammell Laird and Co., Birkenhead, the Phœnix; and one at Chatham Dockyard, the Parthian. The ceremony of laying the first keel-plate of the last-named vessel took place on July 6, 1928. Although these half-dozen submarines will form a separate "P" class, it is understood that in general design they will correspond to the "O" type of the previous year. A name originally chosen for one of the Vickers-Armstrongs boats was Python, but after representation had been made that reptile names were unpopular in the Navy and had been associated with disaster, this name was changed to Pandora.

New Minesweepers.

Two new minesweepers of an experimental type have been put in hand by Messrs. Hawthorn Leslie and Co., Hebburn-on-Tyne. In November 1927, the names of Bridgewater and Sandwich were chosen for the pair. These vessels, which are intended to combine the merits of the old type sloops and minesweepers, have a displacement of 945 tons, a length of 250 ft., breadth of 34 ft., and a mean draught at standard displacement of 8 ft. 5 in. Their estimated horse-power will be 2,000, and the corresponding speed 17 knots. There is provision for 275 tons of oil, and the armament includes one 4-in. gun. The tonnage of the new class is thus about mid-way between the 800 tons of the twin-screw minesweepers of 1916–18, and the 1,250 tons of the sloops of 1915–16. The horse-power and speed were similar in both of these classes, but it may be noted that whereas, with reciprocating engines burning coal, the minesweepers had 2,200 horse-power for a designed speed of 16 knots, the new vessels, burning oil, have 200 less horse-power for a speed one knot greater. The Bridgewater was launched on September 15, and the Sandwich on September 29, 1928.

Auxiliary Ships.

Progress has been made with the construction of the submarine depot ship Medway and the fleet repair ship Resource, both of which were ordered in the winter of 1926-27, as announced last year, from

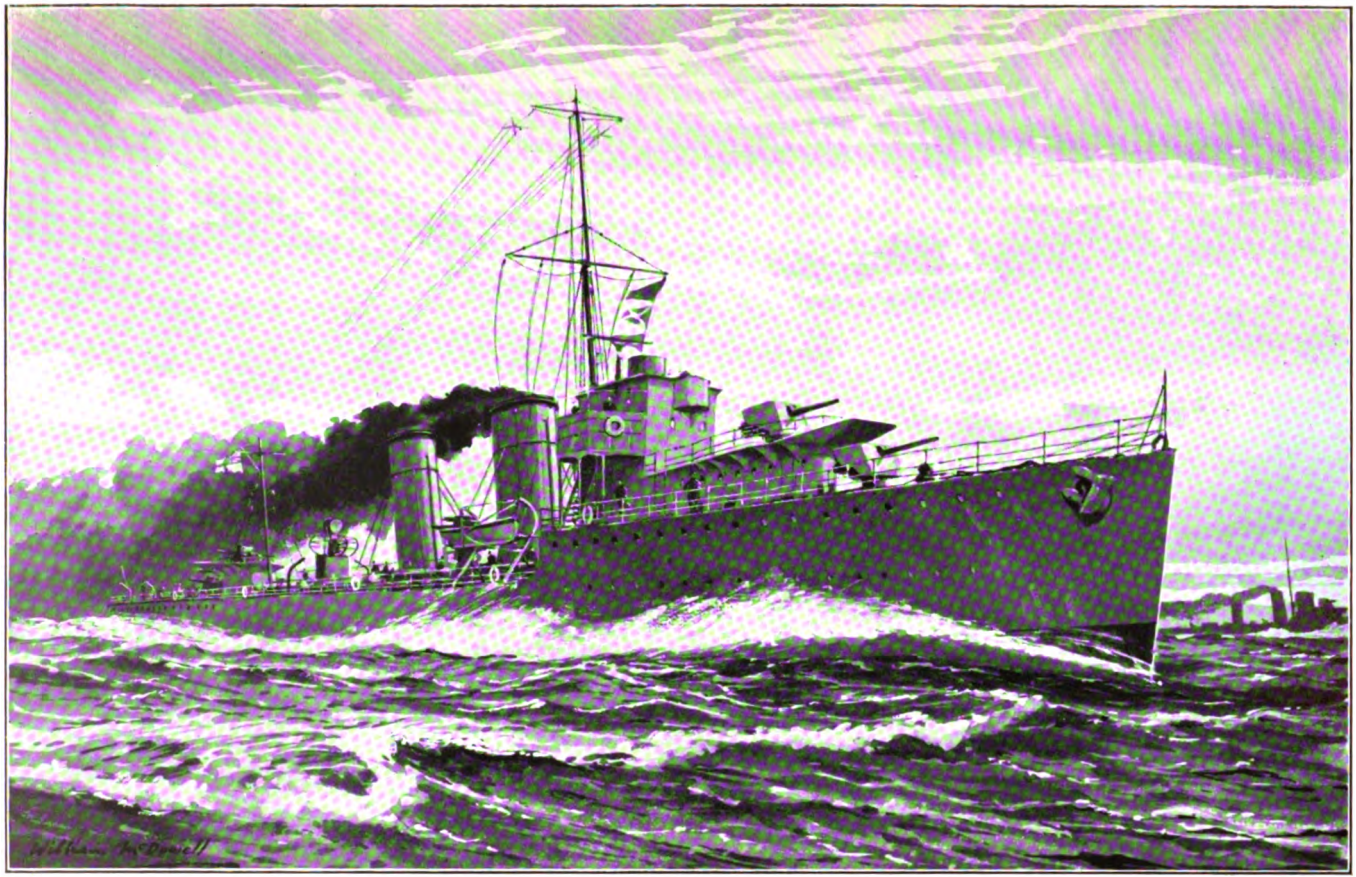
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the Vickers-Armstrongs firm, to be built at Barrow. The Medway was launched on July 19, 1928, when the naming ceremony was performed by Lady Chatfield, wife of Vice-Admiral Sir Ernle Chatfield, the Third Sea Lord. She has a length of 545 ft., and will be fitted with M.A.N. internal combustion engines of two-stroke type, developing 4,000 horse-power. Her equipment as depot ship includes a foundry, machine shop, plate shop and smithy, torpedo shop, plumbers' shop, etc., where all machinery repair work for submarines can be carried out. Referring to the new departure in introducing M.A.N. engines Commander Sir Trevor Dawson, at a luncheon after the launch of the Medway, said that when the war broke out Messrs. Vickers' two-cycle Diesel engine was running, but all experimental work of that kind had to close. Foreign competitors continued their research work, and overtook them in what turned out to be work of importance. His company was faced with a problem, but realising that they had to catch up with Continental competitors, they decided that the best thing to do was to take out a licence for the patents and designs of the Maschinenfabrik-Augsburg-Nürnberg A.G.

The four river gunboats constructed for the Chinese rivers by Messrs. Yarrow and Co. at Scotstoun are now in service. They are the first turbine-driven vessels on the Upper Yangtse. Supplementing the details given in the last "Annual," it may be said that in the larger vessels, Gannet and Peterel, of 310 tons, the length overall is 184 ft. 9 in. and between perpendiculars 177 ft. The single-reduction geared turbines develop 2,250 s.h.p. at 400 r.p.m., the two oil-burning Yarrow boilers having each a heating surface of 2,500 sq. ft., the contract speed being 16 knots. In the smaller vessels, Seamew and Tern, of 262 tons, the length overall is 167 ft. 9 in., and between perpendiculars 160 ft. The single reduction geared turbines develop 1,370 s.h.p. at 450 r.p.m., the Yarrow boilers having a heating surface of 1,530 sq. ft. The contract speed is 14 knots. The armament includes two 3-in. B.L. guns and eight 0·303 in. Lewis guns, the three breech-loaders and six of the Lewis guns being mounted on the battery deck and the remaining two Lewis guns on the fighting top. There is accommodation for the commander, three officers, 14 petty officers, and a crew of 40 Europeans and nine natives. Accommodation for the European crew is on the battery deck and for the rest on the main deck.

It may be well to place on record the systematic manner in which ships of the replacement programme are being named. It is now a more or less settled practice that battleships shall take the names of the most distinguished admirals, such as Nelson and Rodney. Cruisers of the "A" type are named after counties, and of the "B" type after cathedral cities. Flotilla leaders will take the names of flag officers of lesser distinction than those allotted to battleships, such as Codrington. Destroyers are being named from the list of old frigate names of the Royal Navy, in an alphabetical sequence, beginning with the initial "A," *e.g.* Acasta and Achates. To submarines have been allotted names from the classics such as were formerly borne by frigates and small craft, and these, too, will

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(By courtesy of the builders, Vickers-Armstrongs, Ltd.)

H.M. DESTROYER ARROW.
(Laid down at Barrow, 1928.)

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be in groups in alphabetical order—Odin class, 1926–27 programme; Parthian class, 1927–28, and so on. Minesweepers will take old seaport names, such as Sandwich, and river gunboats the names of sea birds.

For purposes of reference the position of British warship construction at the present time may be summarised as follows: There are now fitting out, and due to be completed during 1929, the cruisers London (January), Devonshire and Sussex (March), Shropshire (September), and York (approximately December); the submarines Odin (August), Osiris (February), Oswald (March), Otus (May), Olympus and Orpheus (uncertain); the submarine depot-ship Medway (April); the repair ship Resource (August); and the minesweepers Bridgewater and Sandwich (March).

The following vessels should be launched during 1929: Cruisers Norfolk, Dorsetshire and Exeter; submarines Parthian, Perseus, Poseidon, Proteus, Pandora and Phœnix; flotilla leader Codrington; and destroyers Acasta, Achates, Acheron, Active, Antelope, Anthony, Ardent and Arrow. There are also due to be laid down in 1929, under the Navy Estimates of 1928, two cruisers, one each at Portsmouth and Devonport Dockyards; one submarine at Chatham and five by contract; a submarine depot-ship at Chatham; two sloops at Devonport; one flotilla leader and eight destroyers, two sloops, and one gunboat, all by contract.

The Admiralty Board.

The changes made in the posts of First Sea Lord, Second Sea Lord, and Third Sea Lord, in which Admiral of the Fleet Sir Charles Madden relieved Lord Beatty, Vice-Admiral Sir Michael Hodges succeeded Vice-Admiral the Hon. Sir Hubert Brand, and Rear-Admiral Roger R. C. Backhouse took the place of Vice-Admiral Sir Ernle Chatfield, had no outward and visible effect upon the course of naval administration, in regard to which continuity of policy has been a marked feature since Mr. Baldwin's Government came into power in 1924. The Naval Service recognises its gratitude to Mr. Bridgeman in this respect, and although there are those who regret the interference with the 1925 programme of shipbuilding, it is generally recognised that the First Lord has championed the cause of the Fleet during a lean and difficult period. The news of his impending retirement from Parliament, owing to failing health, which was made known on September 1, 1928, aroused a widespread feeling of sympathy and regret. He had always shown sound judgment and a steadfastness of purpose, and in particular at Geneva in 1927 had an unswerving regard to the security of his country.

It has been a matter of note that the professional members of the Board are of relatively higher rank than before the war, and that their terms of office tend to increase. In August 1914, the four Sea Lords held the ranks of Admiral, Vice-Admiral, Rear-Admiral and Captain respectively; and there was a Vice-Admiral as Chief of the War Staff who was not then a member of the Board. During the greater part of 1928, the Board, the naval members of which are

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increased from four to six, included one Admiral of the Fleet, four Vice-Admirals, and one Rear-Admiral. Probably the paucity of seagoing commands has been the main cause of interference with the old custom that membership of the Board should be brief and should alternate with periods of sea service. On November 1, 1928, Rear-Admiral Roger R. C. Backhouse succeeded Vice-Admiral Sir Ernle Chatfield as Third Sea Lord and Controller. The latter officer had held the post for 3½ years.

By a fleet order dated July 13, 1928, the title of the Director-General of the Medical Department of the Navy has been altered to "Medical Director-General of the Navy." The older title had been in use since January 1, 1844, when it was bestowed upon Sir William Burnett, M.D., K.C.B., R.N., who had been known since 1841 as Inspector-General of Naval Hospitals and Fleets, and from 1832 to 1841 as Physician-General of the Navy.

The Singapore Base.

An outstanding event in connection with the progress of the enlarged naval base at Singapore during 1928 was the passage of the floating dock from England. On being completed by Messrs. Swan Hunter and Wigham Richardson, Ltd., the dock left the Tyne in two portions on June 21 and 28 respectively. The two portions were to join up at Port Said on August 21 for passage through the Suez Canal, but so satisfactory was the progress made on the journey to Gibraltar and through the Mediterranean that the dock was passed through by August 7, over a fortnight ahead of schedule. The transit occupied four days, in the course of which the dock was moored aside successively at Kilometre 40, at Timsah, and at Kabret. The passage of ships was maintained daily, with only slight delays, the longest being nine hours, in two cases. The passage of this, the largest structure ever passed through the Canal, was accomplished without a hitch, and without damage to the banks. As Lord Inchcape wrote in a letter to *The Times*, this reflected credit on the tug masters who had the handling of its immense masses in a narrow, wind-swept waterway and upon the technical staff of the canal charged with the special arrangements for its transit. "All concerned," he wrote, "are to be congratulated on the accomplishment of a difficult task, the complete co-ordination of which can have been no easy matter for the canal officials." The first section of the dock arrived at Singapore on October 12, and the second on October 16. The original programme anticipated that they would arrive about October 31 and November 11 respectively.

As to the base itself, some little delay arose in the completion of the contracts, arising out of points of detail as between the Admiralty and the Treasury, but in the middle of August, 1928, the First Lord was able to state that these were in process of settlement, and that the scheme would go forward as framed. On September 27, 1928, it was announced that the Admiralty had accepted the tender of Messrs. Sir John Jackson, Ltd., of 53, Victoria Street, Westminster, for the construction of the new dockyard. The total estimated cost

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of the work is £7,750,000, made up of £6,917,000 for the base, £810,000 for machinery, and £23,000 for furniture. This excludes the cost of the floating dock, officially known as No. IX., for which £919,271 was voted up to March 31, 1929, leaving about £56,070 to complete. Towards the cost of the base, the Malay States are contributing £2,000,000, New Zealand £1,000,000, and Hong Kong £250,000, of which the last-named was taken into account in the Navy Estimates of 1925 and 1926, and the two former are being spread over a term of years, and will be shared with the War Office and Air Ministry. It is anticipated that the work will be completed in 1937.

Fleet Distribution.

The principal event of the past year in the realm of the distribution of the Fleet has been the advent in China of the five cruisers of the Suffolk class. The entry into service of this group of vessels enabled the Admiralty to reconstitute entirely the Fifth Cruiser Squadron. Of the vessels relieved, the flagship Hawkins, on being replaced by the Kent, returned to England for a long refit. The Despatch and Durban were transferred to the America and West Indies Station, the former as flagship in place of the Calcutta. The Vindictive was placed in the Atlantic Fleet to succeed the Curacoa as flagship of the Second Cruiser Squadron; and the Carlisle paid off for large repairs at Chatham, after which she was expected to go to the Africa Station in place of the Lowestoft. Another change on the Africa Station was the relief of the Birmingham as flagship by the Calcutta, by which one of the last coal-burning cruisers gave way to an oil-burning ship.

The plan of the Admiralty, announced in the First Lord's Memorandum in March 1928, to add a fifth cruiser to the Eighth Cruiser Squadron, on the America and West Indies Station, received a temporary setback owing to an accident. The vessel chosen was the Dauntless, from the First Cruiser Squadron, Mediterranean Fleet. She left Portsmouth on May 21, 1928, arrived at Bermuda on June 1, and on June 29 left for Halifax on her first cruise on the Station. On July 2, she grounded on the Thrum Cap Shoal in the entrance to Halifax harbour, and remained aground until July 11, when she was refloated and towed to the local dry dock. The crew returned to England by steamship, and were formally paid off at Portsmouth on August 1, the ratings to the books of the Victory and the marines to Eastney Depot. The Captain and officers were appointed to the Victory, additional, for leave or disposal, except Commander Clement Moody and Engineer Commander P. W. Warwick, who remained on the Station. On August 3, a Court-Martial at Portsmouth found Lieutenant-Commander T. R. Beatty, the navigator, guilty of negligently or by default suffering the Dauntless to be stranded, and he was adjudged to be dismissed his ship and severely reprimanded. A second Court on August 6 found Captain K. D. W. Macpherson, commanding the Dauntless, guilty on a similar charge, and he was adjudged to be dismissed his ship and reprimanded. As the repairs

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to the Dauntless were likely to take some time, the cruiser Caradoc, formerly in the Third Cruiser Squadron, Mediterranean Station, which was completing an overhaul at Chatham, was ordered to replace her. The Dauntless was reported ready to leave Halifax early in December, a navigating party being sent from Devonport in November to fetch her, to undergo further repairs at Portsmouth, after which she will return to the America Station.

The Flag List.

The First Lord was able to announce in his Memorandum accompanying the 1928 Navy Estimates that the Flag List, by the absorption of a final vacancy, had now been reduced to its fixed numbers. This completed a process which had been going on for nearly six years, since the decision in February, 1922, to alter the establishment from three admirals of the fleet, 12 admirals, 22 vice-admirals, and 55 rear-admirals (a total of 92), to three admirals of the fleet, 10 admirals, 19 vice-admirals, and 45 rear-admirals (a total of 77). Reference to the Navy List will show that two admirals of the fleet and two rear-admirals are borne in excess of the revised establishment, the former having been promoted supernumerary for distinguished war service, and the rear-admirals being additional for service with the Dominion Navies. With the reduced number of places for rear-admirals on the active list, it has become necessary for the Admiralty to exercise to a greater extent the power given them by the regulation which provides that captains whom it is decided not to employ further after promotion to flag rank may be retired on promotion to the rank of rear-admiral. Virtually, this establishes the principle of selection for flag promotions. Of the 22 captains who were at the top of their list on January 1, 1928, and who reached their turn for promotion by the end of June 1928, only 12 remained on the active list after advancement, 10 being retired. The time served in the rank of captain varies according to the chances of a flow of promotion. Thus three captains advanced in January 1928, had served 11½ years in that rank; but 4 promoted in April, after several above them had been retired, were only 10¾ years as captains. Much depends upon the position on the list of an officer or officers whom it is desired to keep on. If such an officer is at the head of the captains' list, and a vacancy occurs, he is promoted and remains, no further promotion being caused; but if there happen to be a group who are not staying on, and who are only waiting to get their flags and retire, a regular flow of promotion may be stimulated, tending to shorten the time served as captains. In the old days, when there were plenty of captains' commands, this might have been a serious matter for captains on full pay, with command money and allowances, to be hurried on to the flag list, only to remain indefinitely on half pay. As it is, only about one-half of the senior captains are in employment.

A fleet order of December 24, 1926, scheduled a list of posts which were to count as rear-admirals' appointments for the purpose of the rule that flag officers, promoted whilst serving, will not count

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their service in the new rank to save them from compulsory retirement for non-service in that rank, where the appointment is one definitely assigned to an officer of the lower rank. The Board decided that the following appointments were to count as rear-admirals' posts: Dockyards at Chatham, Portsmouth, Devonport, Malta and Gibraltar; Cruiser Squadrons (but not the Battle-Cruiser Squadron); Rear-Admirals in Battle Squadrons (except the Third Battle Squadron); Rear-Admiral and Commanding Officer, Coast of Scotland; Rear-Admiral (D); Rear-Admiral and Senior Naval Officer, Yangtse; and Rear-Admiral (S); with such other appointments as, in the opinion of the Board, it may become necessary to specify. On March 30, 1928, this order was amended. The appointments of Admiral-Superintendent at Chatham, Portsmouth, Devonport or Malta were deleted from the list. An officer promoted to Vice-Admiral whilst holding one of these posts may be reappointed on promotion, provided he has the necessary sea service to qualify him for retention on the active list.

On October 5, Rear-Admiral H. T. Walwyn, C.B., D.S.O., on his appointment as Flag Officer Commanding and Director of the Royal Indian Marine, became supernumerary to the established list, and in consequence Captain C. M. Forbes, D.S.O., A.D.C., was promoted to Rear-Admiral, increasing the number of this rank from 46 to 47.

Promotion and Prospects.

It was notified on July 20, 1928, that sea service performed in a foreign warship in commission by officers of the Royal Navy or Royal Marines who are lent under contract to foreign Governments, when of a nature equivalent to sea service in the Royal Navy, may be allowed to count, at the discretion of the Admiralty, as "service in a ship of war at sea" for the purposes of Article 248, King's Regulations and Admiralty Instructions. This article defines the character of service deemed to be in a ship of war at sea, and the new order extended to the case of service in a foreign warship the provision previously made for service in a ship maintained by a Dominion Government. The extension meets the cases of officers lent for instructional purposes, such as those in the British Missions to Chile and Greece.

No changes have been officially announced in the zones of promotion to captain and commander. New captains are taken after from four to eight years as commander; and new commanders after from two to six years as lieutenant-commander. These are the nominal zones, but in practice, selections have been restricted to the upper halves of them—captains being taken after six to eight years as commander; and commanders after four to six years as lieutenant-commander. It is seldom that the Admiralty "dip" below the top half of the zones.

A noticeable feature in regard to officers who are passed over for promotion is that they very seldom are able to serve on until reaching the maximum retiring ages of fifty for commanders and forty-five for lieutenant-commanders. Scarcity of employment no doubt

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accounts for this. It is becoming the practice for an officer, on completing sufficient service to qualify for the maximum retired pay of his rank, to be given no further appointment, and so to be forced on to the retired list after a certain period on unemployed pay and half-pay, even though he is well below the age limit. The loss he incurs is that of a few years' full pay and allowances, as his retired pay is unaffected.

The Imperial Defence College.

From January 1, 1929, Major-General W. H. Bartholomew succeeds Vice-Admiral Sir H. W. Richmond as Commandant of the Imperial Defence College. When the Imperial Defence College was founded in January, 1927, it was decided that the appointment of Commandant should be held for two years, and that the three Services should provide Commandants in turn. Thus there would be little chance of hidebound theory maintaining an evil sway over successive groups of students. General Bartholomew has had long experience of Staff work, the most desirable of all qualifications for an officer undertaking the direction of the new College. The work of the College is not directed towards the training of officers in the command of men, but rather to give them knowledge of the procedure adopted by the Higher Commands of the three Services in the maintenance of their respective forces in peace and in war. The limitations or powers of each are exposed that officers may not expect too much from the other Services with which they may be working on active Service. The Imperial Defence College serves to distribute a general knowledge of the problems of war as they affect the three Services.

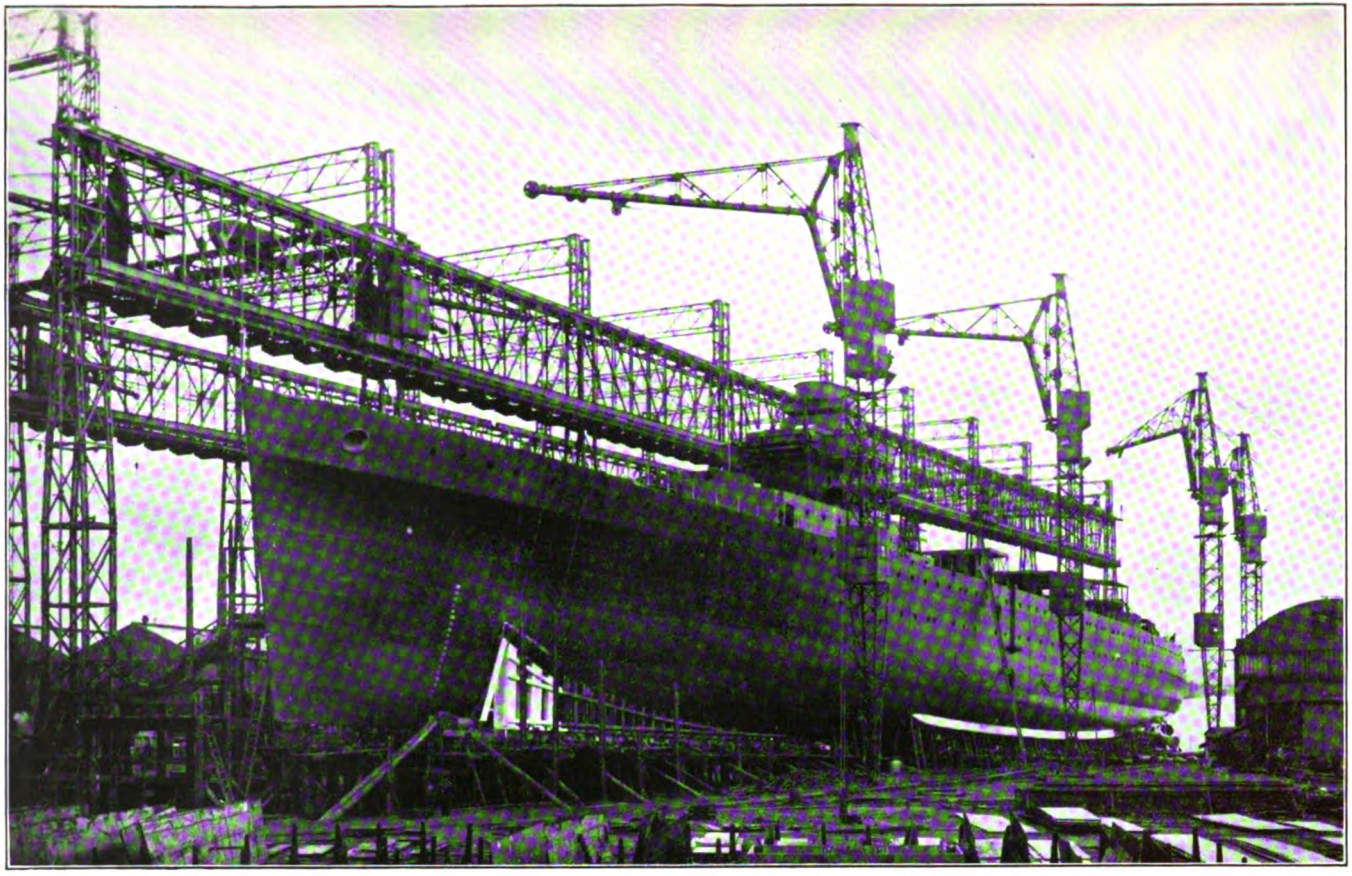
Staff Course Training.

About thirty officers annually are being trained at the Royal Naval Staff College, as compared with the forty per annum which it was hoped would be the quota when the College was opened at Greenwich in 1919. About 240 officers have now been awarded the p.s.c. qualification after completing a course at, or serving for a year on the staff of, the Staff College. These are distributed throughout the various branches of the Service. On the other hand, there are still certain staff positions which are filled by officers who have not graduated at the College.

On July 6, 1928, it was notified that arrangements had been made with the War Office whereby R.N. and R.M. Officers qualifying at the R.N. Staff College would in future be attached, for the period of a week, to the headquarters of a command, divisional or brigade staff, during the collective period of Army training. During 1928, this period was between September 3 and 22.

Specialist training is being pursued with vigour, and it would seem that the proportion of officers who have to specialise is still increasing. On December 2, 1927, it was announced that a new award for officers qualifying as signal specialists, had been instituted

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(By courtesy of the builders, W. Beardmore & Co., Ltd.)

H.M. CRUISER SHROPSHIRE, 10,000 TONS.

(Launched at Dalmuir, July 5, 1928.)

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by past and present signal officers, known as the Jackson-Everett Prize. The honorary distinction (JE) will be noted in the Navy List against the names of officers awarded the Prize. The first winner was Lieutenant I. C. R. Macdonald, R.A.N., of H.M.S. Stuart.

Artificer to Lieutenant (E).

The first of the candidates selected to qualify for commissions in the engineering branch from the rating of artificer apprentice, in accordance with the scheme approved in March, 1921 (see the "Annual," 1921–22, p. 409), were in 1928 appointed to seagoing ships as sub-lieutenants (E). Under this scheme, the following artificer apprentices from the Fisgard have to date been appointed midshipmen (E) and admitted to the R.N. Engineering College at Keyham for training :—

Name.	Division.	Date Appointed.
H. B. Samways	Grenville	Jan. 15, 1924.
E. R. Humphry	Anson	Sept. 15, 1924.
D. W. H. Coughlin	Rodney	May 15, 1925.
H. W. Mole	Benbow	Sept. 15, 1925.
W. F. B. Lane	Anson	Sept. 15, 1926.
R. O. Lockley	Anson	Sept. 1, 1927.
J. S. Wright	Benbow	Jan. 1, 1928.
A. E. Wood	Rodney	Sept. 1, 1928.

Mr. H. B. Samways, the first of the group, was promoted to the rank of Sub-Lieutenant (E) on February 15, 1927, and since January, 1928, has been serving in the battle-cruiser Renown. The progress of this scheme, with the splendid opportunities it offers to promising young men in the artificers' training ship, is being watched with keen interest. It is unlike anything in existence for the executive branch, as the first step of the kind towards commissioned rank which a boy seaman at Shotley or Gosport can take is to pass the examination for Mate at the age of 21. There is no method by which he could become a midshipman while still in his 'teens, unless he chooses to sit for the Civil Service examination for special entry cadets between 17½ and 18½, in which case he would probably find that the lack of early educational facilities, especially in such subjects as Latin and French, would prevent his success. There were cases in the war of able seamen going up for the special entry examination and passing, but since the war competition has been very keen, and, with the vacancies allotted in order of merit, it is too much to expect a boy who has been in the Service for two years, undergoing specialised sea training, to be able to pass high enough. The counterpart to the artificer scheme would be the allocation of, say, two places as midshipmen annually to boys at Shotley or Gosport, but this would involve special training, as executive midshipmen go straight to sea, not to College as do those of the engineer branch, and the transition from seaman boy in a training establishment to midshipman in a ship would be too

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drastic. A more natural change would be that of giving places as special entry cadets in the Erebus at about 17 years of age, such as is done to selected cadets from the Conway and the Worcester.

Advanced Class Entries.

Arrangements were announced on January 6, 1928, for a limited number of boys to be entered in October each year direct in the Advanced Class for training for the seaman, signalman or telegraphist branch of the Royal Navy. Candidates must be between the ages of 15¼ and 16¾ on October 1. The object of the Advanced Class is to give those boys who have received a good education before joining the Service an advanced education, in order to provide well-educated men for mates and warrant officers and for the higher ratings. The advantages that must accrue to a boy with a good education are obvious, as he should experience little difficulty in grasping the advanced subjects of which he will require to have a knowledge later in life. Candidates are admitted by competitive examination after recommendation by local education authorities and similar bodies, including the Superintendents of the training ships Arethusa, Warspite, etc. Some are also admitted without competitive examination, provided that they are in possession of certain educational certificates. A pamphlet entitled "The Royal Navy as a Career," containing full particulars, may be obtained from the Admiralty or local education authorities.

Uniform Changes.

Only minor changes affecting the uniform of officers and men have been instituted since the last issue of the "Annual." On April 5, 1928, it was decided, with His Majesty's approval, that epaulettes are not to be worn when the great coat is ordered with full dress, or with the "frock coat with epaulettes" dress, but on the distinct understanding that the great coat is not taken off. The need for this order obviously arose owing to the impossibility of wearing a great coat over epaulettes. As there are various occasions, such as funerals, at which it is desirable to wear great coats, but at which the regulations prescribe a dress with epaulettes to be worn, the concession is appreciated. Another minor change in the regulations, effective from March 2, 1928, is that plain soft-fronted white shirts, with stiff cuffs, may be worn with white mess undress in naval messes.

The King has been pleased to direct that not more than three neck badges are to be worn at any one time in full dress; that is to say, in dresses Nos. 1 and 8. Knights Commanders and Commanders of Orders, and Companions of the Orders of the Bath, Star of India, St. Michael and St. George, and the Indian Empire, will wear the senior ribbon and badge round the neck, and not more than two other badges emerging from between the buttons of the coat. Other amendments to the regulations for wearing medals and ribbons were published in A.F.O. 3208, 1928.

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An order dealing with the undress sword belt, dated May 18, 1928, explained that the intention of the regulations on this subject is that, except midshipmen, naval cadets and paymaster cadets, all officers, including flag officers, shall wear on the undress sword belt the clasp with a wreath of laurel round the edge only, and in the centre an anchor surmounted by a crown, but without a wreath of laurel.

On August 24, fleet orders notified that the design of the crown embodied in certain badges of rating and distinction, and in cap badges, had been amended, to approximate more closely to the official design of the Tudor crown. The introduction of the word "Tudor" in this connection was new, as in the uniform regulations only the word "crown" was used, as on page 115 of the Appendix to the Navy List.

Experiments were carried out at R.M. Divisions with a view to the abolition of the khaki cover used to meet active service head-dress requirements, and it was found that all conditions could be met by the application of khaki blanco to the white helmets of the Wolseley pattern, as and when required, the normal colour of white being reverted to after each occasion. The change of colour is only to be made for active service or the annual weapon and tactical training periods.

It was approved in April, 1928, that a gratuitous issue of two tropical singlets and two pairs of tropical shorts should be made to each naval rating serving for the round trip in H.M. ships employed on trooping duties to and from tropical stations. In the event of a ship being employed on further trooping duties, no second issue is to be made until after the expiry of twelve months from the date of the original issue. About the same time, it was decided to adopt an improved pattern sun helmet, fitted with three beckets to keep the hat ribbon in position. The use of metal retainers for hat ribbons is not necessary with these new pattern helmets.

Another minor "fashion note" published since the last "Annual" is a notification that the kamarband may, at the option of the wearer, be worn in hot climates with the white mess jacket, instead of the blue evening waistcoat in white mess undress (No. 10), but will not in future be worn instead of the white evening waistcoat in white mess dress (No. 9). White gloves are to be worn with white full dress (No. 8) and white dress (No. 8A).

Pay and Allowances.

The next triennial revision of the rates of pay of naval officers is due to take effect on July 1, 1930. No greater confidence than formerly is felt in the index figure of the cost of living according to which the current rates, as distinct from the standard rates, are fixed. The Government still refuses to grant an allowance to married naval officers such as is paid to officers of the Army and Air Force. In comparisons which are sometimes made between the pay of naval officers in 1914 and at the present time, the change in their total emoluments is frequently not indicated correctly. The effect of the

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change made in 1919 was to increase pay but to reduce allowances. Accordingly, if comparison is made of rates of full pay only, the percentage increase in emoluments is made to appear appreciably more than it really was. It is also forgotten that the retired pay of naval officers—in reality deferred pay—was increased by a smaller ratio than the active service pay. As an example of reductions in allowances, the case of captains' command money may be cited. A special rate of 5*s.* a day was given before the war to any captain appointed for special service, which covered practically all cases where the officer was not already in receipt of command money at a higher rate. This is no longer payable, so that the 1914 rate should be increased by 5*s.* a day to arrive at an accurate comparison. Similarly, in the case of lieutenant-commanders, most of the officers received allowances which were abolished in 1919, or appreciably decreased. Specialist allowance which was then 4*s.* or 3*s.* a day is now only 2*s.* 6*d.* Over and above this is the fact that the 1914 standard was ridiculously low in relation to the services and qualifications demanded, and should not be accepted as any criterion for present or future comparison.

From April 1, 1928, the rate of equipment allowance granted to probationary lieutenants, R.M., entered direct, or granted commissions from R.M. gunner, for the purchase of a suitable prismatic compass, graticulated prismatic binoculars, and a revolver, was increased from £13 19*s.* to £15. The following allowances were to operate from the same date: £6 18*s.* to sub-lieutenants and mates, on confirmation, for the purchase of prismatic binoculars; £10 to midshipmen (E), on appointment to the R.N. Engineering College at Keyham, for the purchase of technical books and instruments; and £2 5*s.* to acting signal boatswains, on promotion, for the purchase of a suitable telescope.

A fleet order dated March 16, 1928, directed that officers who qualify or requalify as acting interpreters in French will not be regarded as eligible to receive appointments as such. They will, however, in lieu of acting interpreter's allowance (1*s.* a day) receive an allowance of 5*s.* a day limited to those days on which "substantial use is made of their services as interpreters." They will remain eligible to receive the appropriate gratuity on qualifying as acting interpreters, and also the allowance of 5*s.* a day for giving instruction in French to junior officers, but this allowance may not be made concurrently with that above referred to.

A reduction in the rates of gratuity payable to naval ratings and marines on leaving the Service, to assist them in providing plain clothes, was announced to take effect from April 1, 1928. The reduction for naval ratings was from 13*s.* 6*d.* to 13*s.*; for staff sergeants, from 24*s.* to 23*s.*, colour sergeants and sergeants, 14*s.* to 13*s.*, and rank and file, R.M., 10*s.* 6*d.* to 10*s.*

It has for long been a subject of adverse comment that for the bulk of naval officers there are no free or assisted passages granted for wives and children. The facilities in regard to what are called indulgence passages were set forth in fleet orders on February 3, 1928. Accommodation for these passages is occasionally available

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in homeward bound transports, where the full allotment of accommodation is not required for entitled passengers. A condition of the grant of indulgence passages is that no expense falls on public funds. Thus there has to be spare accommodation in the transport, passengers have in all cases to make formal application for it, and their messing charges have to be paid before embarkation.

The winding up of the Naval Prize Fund may be briefly mentioned in connection with the general question of emoluments. To March 31, 1928, the total receipts of the Fund were £16,035,000, and the disbursements: Shares paid, £14,755,000; grants to naval and merchant service charities, £195,000; compensation, damages, expenses, etc., £611,500; reserved for unpaid shares, £195,500, making a total of £15,757,000. The net available balance was therefore £278,000. There are various claims which it has not yet been possible to bring to a final decision, and there is no time limit barring the presentation of new claims. Thus a delay of many years might occur before the amount finally available for charities could be ascertained and distributed. From the date of the passing of the Naval Prize Act, 1928, the Treasury undertakes the responsibility of meeting any claims, in return for a payment of £126,500 from the net available balance. There is thus left a balance of about £151,500 which the Admiralty will be able to distribute among charities.

The Fleet Air Arm.

The Air Estimates for 1928 provided for the formation of two new flights for embarkation in aircraft carriers and battleships, bringing the strength of the air units allotted for Fleet work to a total of 25 flights (12½ squadrons). The work of the Fleet Air Arm during the year was increased by the completion of the conversion of the Courageous, which was commissioned on February 21, 1928, completed her trials with success, and on June 2 left Portsmouth to join the Mediterranean Fleet as a second carrier with the Eagle. This made five modern aircraft carriers in the British service, the others being the Argus and Furious, in the Atlantic Fleet, and the Hermes in China.

A modification was made of the conditions under which naval and marine officers are attached to the R.A.F., for service as pilots in the Fleet Air Arm. Formerly, there were five periods, "A" to "E," consisting of four years on air work, two years' general naval service, two more periods of two years each on air work, and the fifth alternative. This division into definite periods was abolished. Naval officers may now be employed on flying duties for the whole of their time as sub-lieutenant (where applicable), lieutenant and lieutenant-commander, subject to a minimum of two years in general service as lieutenant or above; but it is intended that such officers should not, normally, serve more than five years as pilots in one spell. This is subject to their being fit and suitable for air service, and remaining willing to serve as pilots. Royal Marine officers are to be employed on flying duties until they attain five years' seniority

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as Captain, subject to not more than five years' continuous service as pilot without a period of Corps duty.

The aircraft embarked in the carrier Argus and the cruiser Vindictive, and commanded respectively by Wing-Commander C. E. Maude and Squadron Leader E. J. P. Burling, both formerly in the R.N.A.S., rendered good service during the threatening situation in China in 1927–28.

It was arranged between the Admiralty and Air Ministry in August, 1928, that the system of voluntary classes for the training of certain naval ratings and R.A.F. personnel in the duties of the sister service, instituted in 1926, should be discontinued. In every battleship and cruiser carrying aircraft, one engine-room artificer and one shipwright are to be capable of performing the duties of aero-engine fitter and carpenter rigger, R.A.F., respectively, if the need should arise; and one ordnance artificer is to be sent for five days' instruction to an Air Force gunnery school to familiarise himself with the latest types of aircraft armament fittings. These are only emergency precautions.

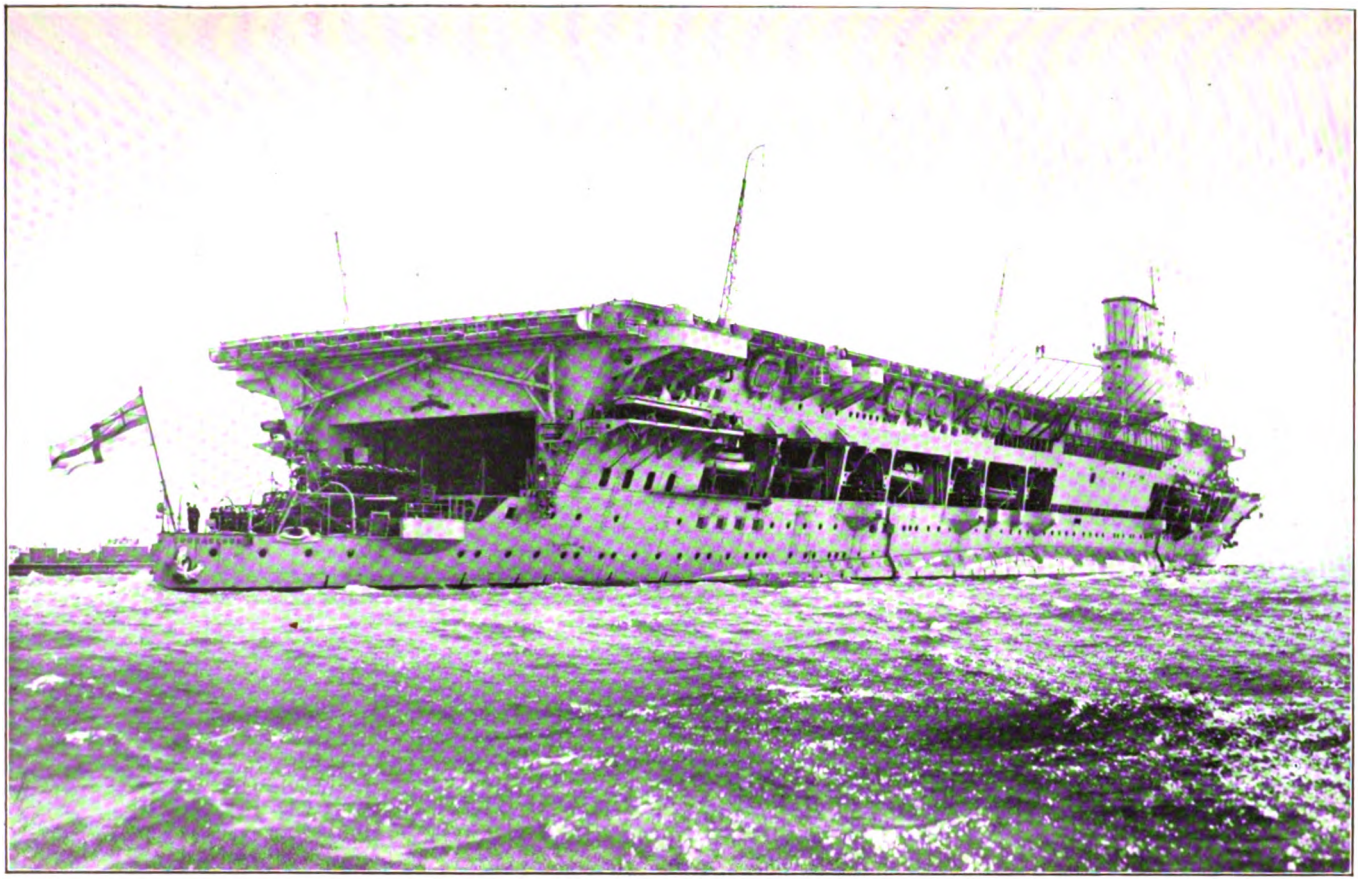
Further information concerning the development of the Fleet Air Arm will be found in a later chapter. It was typical of the great interest taken in this Arm of the Service that during "Navy Week" at Portsmouth Dockyard, from August 18 to 25, H.M.S. Furious, the first aircraft carrier to be open to public inspection, attracted the largest proportion of visitors. The spacious flying deck, the wired galleries below it, the lift to convey an aeroplane to one of the huge hangars, the wide iron lattice doors to close off sections, the perforated iron plates on the flying deck which can serve the purpose of wind screens, and the two control positions on either side of the flying deck from which the naval officer and the air officer direct their respective operations—all possessed the charm of novelty and attraction for those privileged to see them for the first time.

Naval ratings and marines serving in the Fleet Air Arm and borne on the books of Atlantic Fleet ships are in future to be granted 42 days' leave per annum. Periods served ashore under R.A.F. discipline during the year (whilst flights are disembarked) will not involve any curtailment of this leave.

Navy Welfare Conference.

The Navy Welfare Conference was held in the spring of 1928, on substantially the same lines as in 1926. The central port meetings were held at Chatham. The Admiralty expressed their wish that the men's representatives should be those who were in the most real sense representatives of lower deck views, and it was directed that every encouragement should be given to men who desired to put themselves forward as candidates for election. Subjects to be regarded as outside the purview of the Conference were: Matters of policy, such as the employment or distribution or training of the Fleet; matters of discipline, or the general arrangements of duties in the Service; individual claims, or individual grievances, of any kind; matters affecting individual ships or establishments; canteen

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(*Photograph by Stephen Cribb, Southsea.*)

H.M. AIRCRAFT CARRIER COURAGEOUS.
(*Commissioned after Conversion, February*, 1928.)

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arrangements; and complements of ships and establishments. No request previously refused may be repeated under five years. The list of general requests put forward in 1928 was published in a fleet order on June 22. They numbered 26, and dealt with uniform, equipment, railway concessions, and the like. A more suitable pattern of oilskin was asked for; central heating at the naval depots; improved ventilation in ships; a limit of 2½ years' service in the Atlantic Fleet at one time; an independent appeal tribunal in regard to invaliding; and railway tickets at a single fare for return journeys, instead of single fare and a third.

In regard to the last-named matter of travelling concessions, it was notified on May 25, 1928, that the railway companies had agreed to the following two extensions of these: (1) The period of availability of the return halves of concession tickets has been extended from two to three months (the longer period of availability allowable in the case of officers on foreign service leave remaining unaltered); (2) The concessions have been extended to cover journeys to and from railway stations in the Irish Free State, subject to the existing rule that, in the case of officers, concession tickets are issuable only at the stations specified in the list in A.F.O. 964/26, to which the names of Bantry, Cobh (Queenstown), Cork and Crosshaven have been added.

A change which is typical of the added comfort and amenities of life on the lower deck was indicated by a fleet order dated April 27, 1928. It has been decided to substitute gradually white leather cloth for the brown linoleum formerly supplied as table covering for seamen's messes. This white cloth will be replaced free of cost to the messes every five months, instead of every six months as in the case of the brown linoleum. In order to protect the cloth against damage by hot dishes, short lengths of the brown linoleum are supplied to be placed at the end of each table to serve as a mat.

The Naval Canteen Service.

The Naval Canteen branch of the Navy, Army and Air Force Institutes continues its useful and important work. The question has been discussed during the year of placing all canteens under the management of the N.A.A.F.I. At the meeting of the Headquarters Naval Canteen Committee held on April 20, 1928, a letter was read from the Admiralty stating that, after full consideration, it had been decided to make no change for the present in the existing arrangements under which canteens in H.M. ships on the China Station are conducted by Chinese contractors. Reference was made to the fact that the N.A.A.F.I. have, at the request of the ships and establishments concerned, undertaken the running of a certain number of bookstalls. The men's representatives urged that the extension of the Corporation's activities in this direction would be beneficial to the lower deck. At the meeting of the Headquarters Committee held on August 17, 1928, it was announced that the Admiralty had notified their decision that the canteens of the Excellent, gunnery school, and R.M. Divisions should be placed under the management of the N.A.A.F.I. from July 1, 1929.

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The question of family trading by naval men caused some discussion among local shopkeepers in the vicinity of the home ports, who represented it as unfair competition. But apart from the right of naval men, in common with any other class of the community, to trade among themselves for their mutual benefit if they so desire, there was also the question of the public advantage. If the privilege of duty-free tobacco, and such like, were stopped, there must inevitably be an increase of the pay of the Fleet, the burden of which would fall upon the taxpayer. In this connection, an order was issued on April 20, 1928, that the total value, at current issuing prices, of the quantities of provisions permitted to be landed weekly by any man under article 1822 of the King's Regulations is limited to 4*s*. per head. The individual articles and maximum quantities of each that may be taken up within this value are: Four pounds of fresh meat; three pounds of potatoes; two pounds each of preserved meat or salmon, and flour; two tins of condensed milk; and one pound each of haricot beans or marrowfat peas, tinned suet, rice, and pickles.

In the spring of 1928, the Admiralty notified that it was anticipated that a sum would be available again during the year for distribution as a result of naval canteen trading. As some time would elapse before reports regarding the allocation of the available surplus could be received from the Fleet and summarised at the Admiralty, their Lordships desired to save time by ascertaining in advance the general wishes of the lower deck with regard to the disposal of the amount when it was declared. Commanders-in-Chief were directed to ascertain the views of the ratings under their command, expressed in the form of a list of objects, arranged in order of preference, to which the money should be devoted. The objects chiefly recommended in 1927 were: R.N. Benevolent Trust; improvement of recreational facilities; R.N. Sports Control Board; Trafalgar Orphan Fund; National Association for Employment of Ex-Sailors, Soldiers and Airmen; Vocational training schools; local naval and marine charities; and the National Lifeboat Institution. A proposal was made from one of the meetings of the Headquarters Naval Canteen Committee that the men's representatives on this Committee should be the recognised channel for expressing the wishes of the lower deck regarding the allocation of surplus revenue accruing from naval canteen trading. To this, the Admiralty were unable to agree. How the surplus for the year ended October, 1927, was divided was shown in A.F.O. 2691/28.

Closely allied with the canteen question is that of sport and recreation. The R.N. and R.M. Sports Control Board continues to perform work which is not only excellent in itself but has a marked influence for good upon the health, contentment and efficiency of the personnel. Such work deserves every support, and is the more creditable because it is not financed out of public funds. The interest taken by the Admiralty is shown in various ways. When the complete results for inter-Service sports competitions for 1927 were available it was found that, against the Army, the Navy had won in 5 sports, lost in 4, and drawn 1; and against the R.A.F., won in

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8, and lost in 2. The Admiralty published the details in fleet orders, and their Lordships noted the good results with pleasure, congratulating all concerned.

Volunteer Cadet Corps.

The 1928 Navy Estimates continued the grants to naval units of the Sea Cadet Corps, although there was a reduction in the total of the capitation grants from £525 to £480, owing to a decrease in the number of qualified cadets. These Corps can serve a valuable purpose in fostering the sea spirit in the rising youth of the country, and, given sufficient support in the shape of voluntary service on the part of those qualified to instruct the boys, they should give an ample return for the small sum which they cost. The falling off in the number of capitation grants earned at 3*s.* 6*d.* a head would seem to show that personal service is more important than money in this connection. It was decided in June, 1928, that, as from April 1, 1928, volunteer cadet corps attached to the R.N. shore establishments in the United Kingdom, and boys' corps affiliated to R.N.V.R. Divisions, should be eligible for assistance from naval funds to the same extent as recognised units of Sea Cadet Corps. A grant of 3*s.* 6*d.* per annum in respect of each efficient cadet is paid to the commanding officer of each establishment or division to which such a corps is attached. It is utilised to meet the necessary expenses incurred in the formation, organisation and administration of the corps, and for increasing their efficiency, but not for social, religious, or other purposes. Grants are not payable to Royal Marine Volunteer Cadet Corps.

Submarine Detectors.

It was decided in August 1928, to reorganise the Submarine Detector (Seaman) Branch, and to make it separate from, and equivalent to, the gunnery and torpedo branches. The holding of the rating of submarine detector operator (equally with that of S.G. or S.T.) is now recognised as one of the qualifications for higher substantive rating, and for this reason the rule that a submarine detector rating must obtain the S.T. rating is abolished. Improvements in pay were introduced, the rate of all submarine detector instructors being increased from 1*s.* to 1*s.* 3*d.* a day, and a distinctive badge was introduced for the new Branch.

The Mechanician Branch.

A reorganisation of the Mechanician Branch came into force from December 1927. Mechanician candidates awarded a certificate by the Admiralty on the results of the passing-out examination are rated and sent to sea as mechanicians, second class—a new rating, as formerly mechanicians had all been of the same class. A new daily rate of pay of 7*s.* 6*d.*, or 6*d.* a day less than first class, was instituted. Mechanicians, second class, have the relative rank of petty officers. When qualified, they will be advanced to

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mechanician, first class, with the relative rank of chief petty officer. This is after certain periods of service in the lower grade. Mechanicians of all grades will in future be borne as part complement.

Petty Officers' Courses.

The policy of a special course of instruction for petty officers is bearing good fruit. Primarily, the ratings chosen to undergo the petty officers' course are leading ratings of the seamen, signal, telegraphist and stoker branches who have qualified and are recommended for advancement, and regulating petty officers of less than five years' seniority. Every effort is made to pass ratings of these categories through the course at the earliest opportunity. If sufficient men are not available, the classes are completed with petty officers, acting or confirmed, of the seaman, signal, telegraphist and stoker branches, of less than five years' seniority. No rating is accepted for the course within two years of discharge to pension, or who, being within two years of completing his first engagement, is not prepared to re-engage.

In a report on the higher educational test of March, 1928, the nineteenth occasion on which this examination had been held since it was introduced in April 1919, the Admiralty noted the satisfactory increase of entries. At the first examination, there were 69 candidates, taking 196 papers. By October 1923, the numbers had risen to 856 candidates taking 1,970 papers. In the March 1928, examination, 1,182 candidates came forward, and sent in 2,210 papers, both of which figures constituted a record. Of the 1,182 candidates, 493 had not previously entered for any subject of the examination. The total number of names on the register was 7,192. A somewhat disappointing feature of the March 1928, examination was the comparatively small number of papers which obtained first-class marks (75 per cent.), particularly in general knowledge, history and geography. Out of the 2,210 papers, 354 had first-class marks, and 944 second-class marks.

Vocational Training.

The admirable schemes for the vocational training of seamen and marines continue to make progress. The Navy Estimates of 1928, for the sixth year, included a small sum (£5,000) towards the expenses of this training. In March, a new course in physical and recreational training was started at Portsmouth in order to help men to obtain employment of this nature in civil life. During the six months ended March 31, 1928, there were 1,288 applications from men for the various courses. In the same period, 625 men were trained, and there were 311 under instruction at the end of the six months. of these, 276 were in the motor course, 124 in that for " handy men," 63 in internal combustion engines, 58 in boot repairing, 38 in foreign languages, 24 in canteen work, and the rest in barbering, pig and poultry keeping, oxy-acetylene welding, bricklaying, chemistry, cinema operating, and electrical installations.

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The Royal Marines.

The King was graciously pleased to approve the grant, with effect from June 1, 1928, of the temporary rank of Brigadier to Colonels-Commandant, Royal Marines, while in command of Royal Marine Divisions and the Royal Marine Depot. The officers' emoluments and rank remained unchanged. The first Colonels-Commandant to be granted the rank under the new order were Percy Molloy, Chatham; Arthur G. Little, C.M.G., Portsmouth; Charles L. Mayhew, Deal Depot; and George L. Raikes, C.B., D.S.C., Plymouth. This decision followed a similar order in the Army.

Early in 1928, the 12th Royal Marine Battalion returned to England after its year's service in China, where it served, first under the command of Lieutenant-Colonel George Carpenter, O.B.E., D.S.C., and, after his promotion, by Lieutenant-Colonel L. C. Lampen. The Battalion was divided up for duty in various places, in all of which its service was most valuable during a time of stress and difficulty.

The past year has seen the abolition of the Reserve of Officers, R.M. This decision had effect from November 3, 1927. A fleet order on February 17, 1928, announced that in accordance with the policy of assimilating, as far as possible, the conditions of service of marine officers to those of naval officers, authority had been obtained to render all retired officers, R.M., including warrant officers, temporary officers and acting warrant officers retired with retired pay or gratuities, liable to be called out by Proclamation for service in time of war or emergency. Marine officers allowed to resign their commissions will be eligible, at Admiralty discretion, to be placed on an Emergency List under conditions similar to those applicable to the list of Emergency Officers, R.N. Retired marine officers recalled to service in war or emergency, or voluntarily re-employed in time of peace, or who may be appointed to attend courses of instruction, will be dealt with as regards emoluments in the same manner as retired officers of the Royal Navy, similarly recalled or undergoing instruction.

Approval was given by a fleet order dated June 29, 1928, for issues of boots to R.M. detachments serving afloat to be of either pattern (sea or shore service) at the option of each individual non-commissioned officer or man, provided that such ranks are in possession of at least one pair of each type in good condition.

II. THE DOMINION NAVIES.

Australia.

The year 1928 was an important one in the post-war development of the Royal Australian Navy, as it witnessed the completion of the cruisers Australia and Canberra and the submarines Oxley and Otway. No cruiser had been added to the Navy since the Brisbane was completed in 1916, and no submarines since AE.1 and

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AE.2 were put afloat in 1914. The Australia was commissioned at Clydebank on April 24th, 1928, for service as flagship of Rear-Admiral George F. Hyde, C.V.O., C.B.E., Commanding the Australian Squadron, who had returned to England in the Melbourne, which transferred her crew to the new vessel, and then paid off to prepare for sale. The Canberra was commissioned at Clydebank on July 9, by Captain G. L. Massey, R.N., late of the Sydney, and after trials was ordered to join the Atlantic Fleet in October for a period of about three months before proceeding to Australia. The Australia arrived at Brisbane from England on October 15, 1928.

The submarines Oxley and Otway left the Vickers works at Barrow-in-Furness on February 8th, 1928, and reached Malta on the 19th, after a rough passage between England and Gibraltar. Some constructional weakness developed in the engine columns of the vessels, and they were detained at Malta for this to be made good at the expense of the builders. During the reconstruction, they were reduced to reserve at Malta, and completed to full crew again in September. They were able to leave Malta on November 15, and were due at Thursday Island on January 19, 1929. These Australian submarines are slightly larger and faster than the Oberon, completed for the Royal Navy in 1927. Their displacement is 1,400 tons, as against 1,345; and their designed horse-power on the surface is 3,000, as compared with 2,700, the corresponding speed being 15½ instead of 15 knots. But the armament is identical—one 4-in. gun, one smaller gun, and eight torpedo tubes.

Both the King and the Prince of Wales showed their practical interest in the new Australian warships by visiting the cruisers at Portsmouth. The Prince went all over the Australia on June 28, and the King made a tour of both the Australia and Canberra on July 17, 1928. In a description of the King's visit, a special correspondent of *The Times* said:

> Both vessels are fitted with all the latest innovations in the way of oil-fired galleys and bakeries, loud-speakers in each compartment for transmitting orders, and hot and cold water laid on to every mess deck. They are light and airy between decks, and it is noticeable that all superfluous weight has been cut down, many fittings being of aluminium instead of brass. But there are various small differences. Australia's ships carry no Marines, and rum is not issued as a ration. Instead of mahogany Queensland maple is used for furniture and woodwork. Being lighter in colour, it is pleasing to the eye, besides giving an air of spaciousness. Instead of long baths, shower-baths are fitted for officers and men; they not only save time and water, but fuel as well. It is no secret, too, that the majority of Australian seamen, unlike their British confreres, don pyjamas before turning into their hammocks.

The seaplane carrier Albatross, the first vessel for the carriage of aircraft in the Royal Australian Navy, was launched at the Government Dockyard at Cockatoo Island, Sydney, on February 23, 1928, when Lady Stonehaven, wife of the Governor-General, performed the naming ceremony. Particulars of the design of the ship, which were published in October 1928, show that she will resemble the Hermes more than any other vessel of the Royal Navy, with a displacement of about 6,000 tons and a designed horse-power of 12,000. The ship will have a length of 443¾ ft. over all; an extreme beam of 68 ft.; and a draft of 16¼ ft. The propelling machinery will

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(*Photograph by Photopress.*)

H.M. AUSTRALIAN CRUISER CANBERRA, 10,000 TONS.

(*Commissioned at Clydebank, July* 9, 1928.)

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consist of Parsons geared turbines, with a designed speed of 20 knots. The armament includes four 4·7-in. and two 2-pr. guns. There is accommodation for 997 tons of fuel, and the complement will include 450 officers and men.

In regard to the personnel of the Australian Fleet, an event of interest was the promotion to flag rank of Commodore G. F. Hyde, to date February 23, 1928. Rear-Admiral Hyde is the first officer of the permanent Australian Naval Forces to reach flag rank whilst in command afloat, although in 1911, when the Australian Navy was established, Captain (now Vice-Admiral Sir) W. R. Creswell, who had been Director of the Commonwealth Naval Forces, was promoted to Rear-Admiral in the new Service and made First Naval Member of the Australian Naval Board.

On October 1, 1927, the first graduates of the Australian Naval College, established in 1913 at Geelong, and transferred in 1915 to Jervis Bay, reached the rank of lieutenant-commander. The officers were H. B. Farncomb and E. S. Nurse, the latter being an (E) specialist. The Naval Board, in expressing their appreciation at this further stage in the development of the R.A.N., said that this and the recent successes achieved by R.A.N. officers in their courses in England should be a stimulus and encouragement to all.

New Zealand.

There have been no important developments in the New Zealand Division of the Royal Navy since the last issue of the "Annual." The Dominion has continued to maintain two cruisers, the Dunedin and Diomede, of which the latter returned to England in the summer of 1928 to be refitted and recommissioned, leaving again for Auckland on September 6. A report that it was intended to maintain a third cruiser was contradicted by Mr. Coates, the Prime Minister, who added that the two existing cruisers are to be replaced by "B" class ships when they are withdrawn in about six years' time. The New Zealand House of Representatives approved on September 21, 1927, by 51 votes to 10, the proposals of the Government in regard to naval defence which were recorded in the last issue of the "Annual." In moving the resolution, Mr. Coates said that Great Britain was contributing 25*s.* per capita for naval defence, Australia 17*s.*, and New Zealand 8*s.* New Zealand proposed to contribute £125,000 annually for eight years and also was prepared to maintain larger cruisers, which would increase the contribution to 10*s.* per capita annually. He defended the decision to contribute towards the Singapore base, stating that the base was well-placed, being at the centre of the oil supplies and on the air routes. New Zealand's prosperity, her existence almost, was dependent on naval defence. If the necessity for capital ships was admitted, New Zealand must agree to share the cost of the base in order to make the ships efficient.

From April 1, 1928, Lieutenant-Commander C. J. M. Lang, R.N., was appointed Staff Officer (Intelligence) at Wellington, in succession to Lieutenant-Commander F. Lumb. Lieutenant-Commander Lang was lent for duty with the New Zealand Government, and this is the

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first time that the appointment of S.O. (I.) at Wellington has been held under the Dominion Government.

Canada.

The Canadian Government acquired the services of two destroyers on loan from the Royal Navy early in 1928, to replace the Patriot and Patrician, which had become worn out, and were placed on the disposal list at Halifax and Esquimalt respectively. Their places were taken by the Torbay and Toreador, which were renamed Champlain and Vancouver respectively from March 1, 1928. As there was already a Vancouver in the Royal Navy, the latter vessel was renamed Vimy. The Champlain and Vancouver left Portsmouth on March 17, 1928, and reached Halifax and Esquimalt respectively on May 12 and May 30.

The Canadian Parliament has sanctioned the building of two new destroyers in Great Britain to replace the two existing vessels, at a cost of from £270,000 to £300,000 each. In May 1928, the Government instructed Mr. Larkin, the High Commissioner in London, to call for tenders from fifteen British Firms for the new vessels. The specifications call for a class design, but alternative designs may be submitted.

It was notified in Admiralty Fleet Orders on March 30, 1928, that the officer holding the position of Director of the Naval Service of Canada has been appointed as Chief of the Naval Staff of Canada. In future, this latter title will be used in official documents. The present Chief of the Naval Staff is Commodore Walter Hose, C.B.E. (Captain R.N., retired), who was appointed as Director of the Naval Service, in succession to Admiral Sir Charles Kingsmill, in March, 1920.

South Africa.

The South African Navy has remained unchanged in its material since the last "Annual." The minesweeping trawlers Immortelle and Sonneblom have made cruises to Durban and other places along the coast, and the Protea has continued her surveying duties. Commander R. F. U. P. FitzGerald, R.N., lent to the South African Government, was appointed as Officer Commanding the South African Naval Service on June 4, 1928, in succession to Captain Norman H. Rankin, R.N., retired, who had served for five years in the post. The depot ship of the Service is the gunboat Afrikander at Simonstown. The training ship General Botha at Simonstown, under the administration of a Board of Control, continues its good work, but it does not appear that many of the boys go to sea on the completion of their training, many going back to shore employment. In August 1927, the first boy from the ship passed out as a Royal Navy cadet (mercantile training ship entry), and joined H.M.S. Erebus. During 1927, three boys qualified in the ships of the Africa Squadron as midshipmen, R.N.R., and took up apprenticeships in the Mercantile Marine.

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India.

The Bill to create a Royal Indian Navy has not yet been passed by the Indian Legislature, owing to obstruction from the Left Wing of the Assembly, but reorganisation of the Royal Indian Marine on a combatant basis is proceeding. The Indian Navy Bill passed the British Houses of Parliament in the spring of 1927, but on February 21, 1928, in the Assembly at New Delhi, it was rejected by a single vote—55–54. Mr. Chetty, a Swarajist, said that the proposals meant that no Indian officer would be fully qualified for decades, and that the entire burden of maintenance for the Navy would be borne by the Indian taxpayer. An official communique issued at Simla on June 7, 1928, showed that the net result of the refusal to pass the Bill was that the naval force of India would be constituted as proposed, but that it would be deprived of the right to the title of Royal Indian Navy. The following is the text of this important communique, as circulated by the Under-Secretary for India in the House of Commons on July 5 :

" 1. On February 21, 1928, the Indian Navy (Discipline) Bill was introduced in the Legislative Assembly. The main object of this Measure was to apply the Naval Discipline Act with suitable modifications, to the naval forces raised and maintained by the Governor-General in Council, in order that substantially the same code of discipline should apply to those forces as is in operation in British and Dominion Navies. The motion of the Government to refer the Bill to a Select Committee was, however, negatived by one vote, and in consequence, the Government of India have reconsidered their policy in regard to the constitution of an Indian Navy.

" 2. After full consideration and consultation with His Majesty's Government, it has been decided to proceed under the limited powers inherent in existing law, and, in accordance with the recommendations of the Departmental Committee of 1925, to complete the reconstruction of the Royal Indian Marine which has been in process for the last two years in preparation for the inauguration of a Royal Indian Navy, and is already far advanced.

" 3. The future position will thus be as follows : the Force will continue to be designated ' The Royal Indian Marine,' but will become a combatant force, and will assume the functions and serve under conditions regarding pay, pensions, etc., which were originally intended for the proposed Royal Indian Navy. The Government of India will continue to follow their declared policy with regard to the recruitment of Indians to commissioned and warrant ranks of the Service, and the rate at which such recruitment should proceed. One commissioned vacancy in three, both in the executive and the engineer branches of the Service, will be reserved for Indians and will be open to competitive examinations in India on terms and conditions that will, it is hoped, be announced shortly. The discipline of the Force will continue to be regulated under the Indian Marine Act of 1887, which is in itself a Discipline Act, but the change to combatant status will render enrolment under that Act

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compulsory instead of, as hitherto, optional in the lower ranks. The extent of the Act is limited to Indian waters, that is to say, the high seas between the Cape of Good Hope on the West and the Straits of Magellan on the East, and any territorial waters between those limits. The command of the reorganised Force will remain vested in the Director of the Marine, who will be styled Flag Officer Commanding and Director of the Royal Indian Marine. In the first instance an officer of the Royal Navy of the rank of Rear-Admiral will be lent for this purpose by His Majesty's Government. His appointment will be announced shortly, and will probably take effect from middle of November next. In the meantime, the Force will remain under the command of the present Director—Captain E. J. Headlam, C.S.I., D.S.O., R.I.M. The circumstances in which and the conditions under which the Force may, in emergencies, be placed at the disposal of His Majesty's Government are determined by the relevant provisions of the Government of India Act."

Rear-Admiral Humphrey T. Walwyn, C.B., D.S.O., was chosen as the first Flag Officer Commanding and Director of the Royal Indian Marine, under the new regime, to date October 5, 1928, and to assume command about November 16.

Fleet Orders notified on July 20, 1928, that the King had approved of officers of the Royal Indian Marine wearing a uniform similar to that of officers of the Royal Navy, but with distinctive buttons.

III. THE YEAR'S EVENTS.

On July 17, King George set his seal of royal approval on the work of reconstructing, and restoring to her Trafalgar condition, the old Victory, when he inspected the vessel in the dock at Portsmouth which has been consecrated to her use for all time, and unveiled a commemorative tablet. The ship was a primary attraction for large crowds of visitors during Navy Week at Portsmouth from August 18 to 25. The plan of holding these Navy Weeks, during which warships of all kinds are thrown open to public inspection, and people are encouraged to see for themselves something of the life and work on board ships of the Fleet, was extended to all three of the home dockyards, Chatham and Devonport, holding theirs from August 13 to 18. At Portsmouth, no fewer than 89,583 people paid for admission, as a result of which naval and marine charities benefitted to the extent of about £4,000. At Devonport, there were 67,900 visitors, and at Chatham 41,000. Devonport created a record for the highest daily attendance—18,500. There can be no doubt that the policy of the Admiralty in allowing these Weeks to be held is of advantage to the Service in educating the public, spreading a knowledge of its duties and responsibilities, and assisting recruiting. Distinguished visitors to the Dockyard at Portsmouth during the year included King Amanullah of Afghanistan, on March 19, and the Sultan of Muscat and Oman, on September 21. They both inspected the Victory and the battle-cruiser Tiger, and went up to Southampton in a submarine of the " L " class, taking part in diving and torpedo firing practice on the way.

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The general exercises of the Atlantic and Mediterranean Fleets were maintained during 1928 to the fullest extent allowed by the need for economy in fuel and practice ammunition. The Admiralty again permitted Press correspondents to go afloat both in the spring and autumn cruises of the Atlantic Fleet. Among the cruises on foreign stations may be mentioned that of the Durban, which on being transferred from the China to the America Station in May, 1928, proceeded via Japan and Honolulu, and made a cruise up the Pacific coast of Canada to Alaska and beyond the Arctic Circle. The sloop Wistaria made a cruise up the Amazon in December, 1927, and spent Christmas Day at Manaos, 1,000 miles from the river's mouth. The cruise was described in two special articles in *The Times* on April 12 and 13, 1928. South American ports were more frequently visited by British men-of-war during 1928. In addition to the vessels on the America Station, there was the cruise of the destroyers Amazon and Ambuscade, and during June and July the new cruiser Cornwall cruised down the east coast, through the Magellan Straits, and up the west coast, afterwards going on to Honolulu to represent the Mother Country at the Captain Cook Sesquicentennial Celebration organised by the United States. This occasion brought together an Imperial Squadron such as had not been seen before, the Cornwall, from Great Britain, the Brisbane, of the Royal Australian Navy, and the Dunedin, of the New Zealand Division.

H.R.H. Prince George was appointed to H.M.S. Durban as Lieutenant and Interpreter, and joined her on August 24 at Vancouver. On October 26, H.R.H. the Duke of York laid the foundation stone of the new buildings of the Royal Hospital School at Holbrook, on the estate generously presented to Greenwich Hospital by Mr. G. S. Reade, of New Zealand, in gratitude for the work of the Royal Navy during the war. When the School is moved to these more commodious and healthy quarters, much-needed accommodation will be available for the Royal Naval College, and the Queen's House will be set free to become the home of the National Maritime Museum. It was announced at the annual meeting of the Society for Nautical Research on June 20, 1928, that, by the generosity of Sir James Caird, the Macpherson Collection of maritime prints and paintings had been saved for the nation and would be placed in the new Museum in due course. It is also largely due to Sir James Caird that the movement to restore the Victory has been carried to a successful conclusion. This regard for past service and achievement is of happy augury for present and future endeavour.

CHAS. N. ROBINSON,
Commander, R.N.

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CHAPTER II.

Foreign Navies.

The aftermath of last year's Naval Conference at Geneva has been increased uneasiness about the naval situation, particularly on the part of the principal sea Powers who were engaged in, or held a watching brief on that abortive conclave. Since then Anglo-French "conversations" have taken place with the object of clearing up some of the difficulties and paving the way for a further meeting. Unfortunately, the good intentions of the neighbouring and neighbourly nations were either misunderstood, or, in certain quarters, deliberately perverted on the other side of the Atlantic. A section of the American Press seized the opportunity to manufacture a scare that Great Britain and France were about to form a naval alliance and develop their fleets on lines which would enable one to supplement the other. It was also alleged that this was yet another attempt on the part of Britain to circumvent the attainment of "parity" by the United States and the occasion was taken to renew the clamour for a big construction programme.

The myth of a secret agreement with France was officially and emphatically denied by Lord Cushenden, but the episode has served to emphasise, yet again, the difficulties, not to say the dangers, of these international conferences and conversations to reduce naval armaments. Every Sea Power has an instinctive feeling that it requires a certain number and certain particular types of warships for sea security. Each has its own particular problem in maritime insurance, and the fact of the matter is that these requirements do not lend themselves very readily to being reduced to some common denominator. The more they are dissected on the conference table, the more suspicions are aroused; the more each nation's problem is analysed the less easy does agreement appear to be.

Proposals are made for further limitations in the size and armament of capital ships; but it is deemed in the United States that the blessed condition of "parity" has not yet been attained in this type of warship; therefore, that attempt at economy must go by the board. Again, proposals are made to limit the total number of cruisers and the number of 10,000 ton cruisers within that total, but America has little use for small cruisers and is less interested in numbers than in *size*. The British Empire must have a certain minimum *number*, yet, remembering the lessons of Coronel and the Falklands, cannot afford to accept mere numbers at the expense of speed and armaments. Britain and the United States are at one in readiness to abolish submarines, but France and Italy

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regard them as indispensable. Japan, ready enough to compromise in the interests of economy, sits somewhat aloof but refusing to accept a lowlier place than she occupies at present amongst the Sea Powers of the world.

Such are the difficulties which arise in seeking to hasten the reduction of armaments by international agreement and decree. It is evident that the great gesture to "outlaw war" has not, as yet, produced that sense of security which will inspire nations to discard their defences wholesale. It is even becoming questionable whether this sense of security will not come about more surely if controversial discussions are avoided and each Power proceeds frankly and openly with a policy suited to her own naval needs. The risk of competition can hardly be greater than the need for international quiescence on the subject of armaments, in the present day.

New Construction.

The controversy over cruisers gives special interest to a comparison * between the numbers of this class of warship possessed by each of the principal sea Powers; to which has been added a comparison of the gross tonnage of their merchant vessels of 100 tons and upwards :—

Country.	Cruisers.			Merchant vessels ‡ Gross tonnage (1928).
	Built.	Building.	Projected.	
British Empire	49	13	5**	22,174,077
United States	32	8	15†	14,670,272§
Japan	35	6	2	4,033,304
France	16	6	1	3,469,980
Italy	13	6	2	3,483,383

** 1928–29.
† No financial provision yet made.
‡ Over 100 tons displacement.
§ Includes Lake and Philippine Island shipping.
NOTE.—A table giving a comparison of 10,000-ton Cruisers appeared in this section in last year's "Annual."

UNITED STATES.

It is a little difficult for a comparatively self-supporting country like the United States, with very limited extra-territorial responsibilities, to argue logically the necessity for an increase of naval forces at a time when most of the world is bent on easing the burden of armaments. The only reason which might fairly be advanced would be a growing mercantile marine. In fact the American merchant fleet has steadily diminished during recent years. Not unnaturally, therefore, in company with the call for an expansion of the fighting navy, there has been a demand for further Government assistance to develop commercial shipping flying the American

* Official "Return of Fleets," Feb. 1, 1928 (Cd. 3034).

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flag. National pride may demand that American goods be carried in American ships, but in a country where the cost of shipbuilding and standard of seamen's wages is so high, a Government subsidy is indispensable if this position is to be attained. It remains to be seen whether the American people will foot the bill.

As regards the U.S. Navy, a Bill to provide for the greatest additions to the fleet since the Act of 1916, passed the House of Representatives in March 1928, by a large majority; but the formal proposal for it to be considered by Congress was defeated by a "snap" division just before that assembly adjourned in May. This precluded the Bill from being dealt with until December. Furthermore, it must be realised that the question of financial provision is a separate matter. Congress does not deal with Naval Estimates, as is done in the British Parliament, in one Bill setting forth requirements and cost, but in two Bills, one dealing with policy and the other with finance. The former is influenced largely by international considerations and national prestige, the latter is governed by internal politics and domestic economy.

The Bill which it is now sought to pass makes provision for fifteen more 10,000-ton cruisers and one aircraft carrier. It is proposed that five cruisers shall be laid down during each of the fiscal years ending June 5, 1929, 1930, and 1931, and the aircraft carrier in the year ending June 1930. Eight of the cruisers are to be built in Government Yards. In the event of an international agreement the President will be empowered to suspend the whole or a part of this construction.

Meanwhile, all that has been authorised up to the latter part of 1928 are the funds for beginning the four flotilla leaders and three fleet submarines approved in principle in the 1926 programme.

Battleships for Modernisation.

The Oklahoma and Nevada are being modernised and the elevation of their turret guns is being increased from about 15° to about 30°. These alterations were authorised by an Act of Congress approved on March 2, 1927, at a cost not to exceed 13,150,000 dollars for the two battleships. The work approved includes the installation of additional protection against submarine attack, the installation of anti-air attack deck protection, the reboilering of the ships, and the installation of aeroplane handling appliances and of modern fire-control systems. Provision is also made for the introduction of a 5-in. anti-aircraft battery. Plans are prepared for modernising the Pennsylvania and Arizona.

It is reported to be the intention to increase the elevation of all the guns in the battleships except those of the six oldest ships. It will be recalled that the British Government expressed the view that this constitutes a breach of the Washington Treaty. The matter is not, however, regarded in British naval circles as one of serious importance, while the expense would seem to be out of all proportion to the value of the results.

Three battleships have been equipped with 5-inch A.A. guns

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and a fourth will be similarly dealt with during 1928–29; one ship will follow in each succeeding year until all the 14-inch turret ships have been completed in this respect.

New Cruisers.

Of the six 10,000-ton cruisers laid down for the U.S. Navy during the past year, four have now been assigned names. Cruiser No. 27, building by the Brown Boverie Electric Corporation, has been named the Chester; No. 29, at the Mare Island Naval Yard, the Chicago; No. 30, at the Newport News Shipbuilding and Dry Dock Company, the Houston; and No. 31, also at Newport News, the Augusta.

Two of the cruisers are expected to be launched in the spring of 1929.

Naval Air Service.

The year under review has seen the completion of the two huge aircraft carriers Lexington and Saratoga. Both ships have had trouble with their turbines and were, therefore, unable to develop their full power; nevertheless the results of their trials are reported to have constituted several records. The Lexington claims to have created a world's record by steaming the 2,228 miles from San Diego to Honolulu at an average speed of 30·7 knots; also a further one by covering 770 miles in 24 hours. On the measured mile she attained a maximum speed of 33·04 knots. The Saratoga achieved what is claimed to be a record for her class and tonnage (33,000), by obtaining a maximum speed of 33·42 knots on the measured mile.

There is some diversity of opinion in regard to the policy to be adopted for future carriers. It was originally proposed to lay down one carrier a year for the next five years; the Assistant Secretary for Aeronautics wanted to expedite matters further by laying down three vessels of this class in the next eighteen months.

Admiral Beuret, head of the Construction Department, desires that time should be given for experience to indicate what improvements should be made in each successive ship. He has expressed himself as not being in favour of small carriers of less than 10,000 tons, the number of which is not limited by the Washington Treaty, but he has stated that his department has worked out an experimental design for a ship of 13,800 tons to carry 75 to 80 aeroplanes; but such a vessel would have a maximum speed of only 29 knots and her armament would consist of A.A. guns only.

Rear-Admiral Moffet, Chief of the Bureau of Aeronautics, has estimated that 375 aeroplanes will be required for the projected carriers and an additional 100 machines, four to each vessel, for the twenty-five cruisers originally proposed. These together with a 50 per cent. reserve and some machines for training would necessitate a total increase of 759 aircraft of all types in addition to the thousand machines already provided in the five-year air programme. The proposed new carriers, he stated, would carry one squadron of

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bombers and three squadrons of fighting aeroplanes. They would not be able to launch the large bombers as these require a 3,000 feet run to take-off.

The U.S. Fleet in 1929.

The following ships of the U.S. Navy will be in and out of commission during 1928–29 :

	In commission.	Out of commission.
Battleships—		
Full commission	16	—
Reduced commission (being modernised)	2	—
Cruisers	16	16
Aircraft carriers	3	—
Aircraft tenders	1	—
Minelayers	2	2
Destroyers	106	164
Light Minelayers	6	8
Submarines	80	43

Naval Exercises.

Fleet exercises on a large scale were carried out in the Pacific during April and May, during which the naval air force played a conspicuous part.

JAPAN.

The Diet dissolved before the budget for 1928–29 was passed, so that naval finances have depended on last year's estimates, with certain modifications, plus supplementary estimates; the two amounting to 262,444,743 yen, approximately £26,000,000.

The following table shows the position as regards new construction.

Class.	Building. Under 1922 Programme.	Building. Under 1926-28 Programme.	Projected. Under 1926-28 Programme.	Remarks.
Cruisers (10,000-ton)	4	3*	1†	*Two laid down 1927–28; one laid down 1928. †Ordered; being laid down 1928–29.
Seaplane carrier	—	—	1	Not yet laid down.
Destroyers	3	3	3‡	‡To be laid down 1928–29; 9 more to follow 1929–32.
Submarines	10	—	—	4 more to follow 1929–32.
River gunboats	—	—	2	To be laid down 1928–29.
Minelayer	1	—	—	1 more to be laid down 1929–32.
Minesweepers	2	—	—	—

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(*By courtesy of the Japanese Naval Attaché.*)

JAPANESE CRUISER KINUGASA, 7,100 TONS.

(*Built by Kawasaki Dockyard Co,, Kobe.*)

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New Cruisers.

The first 10,000-ton cruiser, the Nachi, laid down at Kure in November 1922, was reported ready to commission in 1928. The completion of the second ship, the Myoko, laid down in October 1924, has been delayed by an accident to a crane, but it was anticipated that she would be ready by October 1928. The remaining two of the 1922 programme are due for completion by the end of 1929.

All the smaller type of cruisers are now completed and no more are, at present, projected.

Naval Air Service.

The completion of the aircraft carrier Kaga was pressed forward so that the ship could be placed in commission in the late autumn of 1928. A seaplane carrier is projected; a much smaller vessel, probably only 5–6,000 tons displacement, seems to be intended, but no details are yet available.

The Japanese navy continues to develop its own air service in accordance with the needs of the fleet and quite independently of the army. Having no Continental air menace, there seems little probability of a separate air force being created and any suggestion of depriving them of their own air arms or of duplicating control would certainly be strongly resisted by the naval and military authorities.

Coronation Review.

A great naval review in honour of the Coronation of the Emperor was held on December 4. In the battle-cruiser Haruna, the Emperor passed down the lines of nearly 200 ships, including all the capital ships except the Ise and Kirishima. Three aircraft carriers, including the Kaga, and 143 aeroplanes took part in the review.

FRANCE.

The 1928 Estimates as finally passed made provision for Frs. 2,451,158,703, approximately £20,000,000. Since then supplementary estimates amounting to Frs. 126,000,000, approximately £1,000,000, have been approved. These sums include the unexpended balance from 1927 and make provision for the maintenance of the fleet and for new construction in hand up to but not including 1928 (except four 2nd Class submarines which are included). The naval authorities are, however, permitted to anticipate the next year's budget to a limited extent.

Battleships placed in Reserve.

As from 1st October, 1928, the three battleships Jean Bart, Paris, and Courbet were placed in reserve commission with reduced crews. This leaves only the Provence, Bretagne, and Lorraine of the 1st Squadron in full commission.

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NEW CONSTRUCTION.

Class.	Building.	Projected.	Remarks.
Cruisers (10,000 tons)	2*	1†	† No financial provision yet—known as C.3.
Training—(6,500 tons)	1	—	Jeanne d'Arc.
Flotilla leaders	12	6	1928 } No financial provision.
		6	1929 }
Destroyers	6	—	
Submarines—			
Cruiser type	1	1	
1st Class	19	6	1928 } No financial provision for projected programme.
		5	1929 }
2nd Class	12	4	1929 }
Minelaying Class	4	1	1928 }
		1	1929 }
Sloops	2	—	
River gunboats	1	—	
Minelayers	1	—	
Aviation Transport	1	—	

* In addition to three completed or completing, 1928.

CRUISERS.

The Duquesne, the first of the 10,000-ton cruisers, was commissioned at the end of 1927. Her speed trials, carried out early in 1928, are reported to have given results which exceeded all expectations, the maximum speed attained being 35·3 knots. The second ship, the Tourville, has also completed her trials satisfactorily. Both were due to leave for a long cruise late in the year. The third ship, the Suffren was commissioned in August. The Colbert, the fourth ship, was launched at Brest on April 20, 1928, having reached this stage in ten months. A fifth ship, known at present as C.2, replaced her on the slips.

Glowing accounts have been published in the French Press of the performance of the Duguay Trouin in rough weather; she is described as having steamed proudly past the "disabled mastodon," the British battleship Marlborough, in a heavy sea off Brest. In fact the Marlborough was ploughing her way steadily at economical speed, and, needless to say, did not engage in a speed contest to prove her seaworthiness. Nevertheless the new French cruisers, of both 10,000 tons and 8,000 tons, appear to be giving satisfaction.

TORPEDO CRAFT.

Of the 1927–28 Programme, the flotilla leader Verdun was launched at St. Nazaire in July and the destroyer Forbin at Havre in the same month. During the year the destroyer Alcyon, laid down in 1925 was commissioned.

The submarines Pascal and Pasteur, laid down in 1926, were launched at Brest in July. Names have been allocated to the submarines of that year's programme as follows:

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Cruiser submarine	*Surcouf*
1st Class submarines . . .	*Achille, Ajax, Argo, Actaeon, Acheron*
Minelaying submarine . . .	*Nautilus*
2nd Class submarines . . .	*Amphitrite, Antiope, Atalante, Amazone*

The submarine depot ship will be known as the Jules Verne.

Naval Air Service.

Some perturbation has been caused by the decision of the French Government to place all air services under the new Minister for Aeronautics. In naval circles the change is strongly criticised. The Government appears to have been influenced to some extent by British example, but they do seem to be aware of the admittedly unsatisfactory position caused by dual control of our own fleet air arm, as the personnel of the French fleet air arm is to remain purely naval and the operational control of the force will be under the sole authority of the Ministry of Marine.

A large increase is being made in the personnel of the Navy's air service and it was the intention to form an additional one and a half squadrons during 1928, in order to bring the strength up to a total of nineteen and a half squadrons.

The aircraft carrier Béarn is reported to have provided valuable experience but not to be a great success for war purposes. Her chief defect is said to be that only about a quarter of her aircraft can be employed at a time owing to lack of space on the landing deck.

Review of the Fleet.

A great review by President Doumergue took place at Le Havre on July 8 from the deck of the new flotilla leader Jaguar. In all, seventy-nine ships took part; these included four battleships, an aircraft carrier, five cruisers, thirty-five destroyers, twenty-four submarines, two minesweepers and eight despatch boats. In a speech, M. Doumergue said that France is determined to hold her naval rank, but not in an ambitious spirit. Complete freedom of the seas was indispensable, he declared, for her to maintain her overseas communications and to protect her 50,000,000 colonial citizens. M. Leygues, the Minister of Marine, stated in an interview that forty of the warships present in the review had been built since the war.

Loss of a Submarine.

The submarine Ondine was sunk in collision with the Greek steamer Ekaterini Coulandris off Cape Finisterre on the night of October 8, with the loss of her crew of three officers and forty men.

ITALY.

The Naval Estimates voted for 1928–29 amount to 1,151,782,030 lire—approximately £12,411,000—and new construction appears to

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be progressing steadily and systematically. The following table shows the position :

Class.	Building.	Ordered.	Remarks.
Cruisers—			
10,000 tons	—	2	1928–29 Programme.
5,000 tons	4	—	1927–28 ,,
Flotilla leaders	12	—	1927–29 ,,
Destroyers	—	4	1928–29 ,,
Submarines	1	—	1922–24 ,,
	2	—	1924–25 ,,
	2	—	1925–26 ,,
	3	—	1926 ,,
	6	—	1927 ,,
	—	4	1928–29 ,,

The Trento, second of the new 10,000-ton cruisers, was completed in the summer and due for service by the end of the year.

Since last year's "Annual" further details of the 5,000-ton cruisers have become available and they would appear to be rather remarkable little ships. They will be called the Alberto di Guissano, the Alberico da Barbiano, the Bartolomeo Colleoni, and the Gioranni della Bande Nere. The main armament is eight 6-inch guns, as compared with the Trento's eight 8-inch. The anti-aircraft armament is eight 4-inch, as compared with the sixteen 4-inch of the bigger class. Geared turbines of 95,000 h.p. are expected to give a maximum speed of 37 knots, which, if it is achieved, will make them the fastest cruisers in the world.

Torpedo Craft.

The first of the 1927 programme of leaders was launched at Fiume on August 10, and named Nicolo Zeno. This group of 12 ships will be a useful addition to Italy's already considerable flotilla of torpedo craft and, again, if they attain the 38 knots for which they are designed, they will be the fastest vessels of their kind in the world.

It is reported that engines of 100,000 h.p. have been ordered from the naval shipbuilding yard at Triestino for a still newer, and presumably faster, type of flotilla leader.

Loss of a Submarine.

A tragic accident occurred on August 6 when, during exercises, the destroyer Missori collided with the submarine F14 off the island of Brioni, and the latter was sunk with all hands. Divers and salvage plant were quickly on the spot, communication was established and the submarine raised within 36 hours in spite of the unfavourable weather, but by then the whole crew of 27 had been asphyxiated by chlorine gas.

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Seaborne Trade.

It is of interest to note that under her present virile leadership, Italy is expanding her shipping and adding to the number of services under her flag to Pacific ports, to Africa, and to the Congo. The subsidy for these services is being increased by 3,112,500 lire. In shipbuilding, Italy stands third amongst the nations, being surpassed only by England and Germany.

General.

A new title " Amiraglio designato di Armata " has been introduced. This will be held by Commanders-in-Chief on relinquishing their appointments.

GERMANY.

It is evident that Germany is doing her utmost to regain something of her former position as a Sea Power. While adhering to the restrictions imposed on her by the Treaty of Versailles, she is using all her mechanical ingenuity to make the most of the new construction to which she is entitled. A certain amount of criticism has been raised by some sections of her community against the very high Estimates for 1928. In spite of a reduction of £465,000, intended as a first instalment towards the construction of a new 10,000-ton replacement ship for one of her old battleships, the estimates amount to approximately £10,500,000.

An official statement explains the high cost of new construction as being due to the limited number of armament firms. A contributory cause is reputed to be the system of welding which has been largely substituted for rivetting in order to reduce weight.

New Armoured Ship.

Great interest attaches to the design of ships which Germany will build to replace her present battleships, a number of which are already over the age limit when they can be condemned under the Versailles Treaty. In a statement by the Marine Office, published in the *Berliner Tageblatt*, it is announced that it is the intention to provide a " vessel which is heavily armed, moderately armoured, and fast enough to escape stronger forces." It is proposed to build four of these ships to commence with, construction to be spread over a term of years with a yearly quota of £3,050,000.

By the use of supergrade light steel and electric welding, instead of rivetting, there is a saving of 550 tons in weight. The armament will include six 11-inch guns in triple turrets, with a much more rapid rate of fire; eight 6-inch guns behind shields; four 3·5 inch A.A. guns; and six torpedo tubes, above water. Reference to the machinery advance in the new design is made on pages 104–105.

The official explanation is that in modernising her battle fleet, Germany's main concern is with her sea security in the Baltic.

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vis-à-vis Russia, there can be little question that what the German Navy lacks in tonnage it will make up in efficiency.

This new 10,000-ton miniature battleship will also be of great interest in view of the possibility of further and drastic reductions in the size of capital ships coming about through an extension of the Washington' Treaty.

Cruisers.

The Karlsruhe and Königsberg, laid down in 1926, were due to complete by the end of 1928; the Köln (cruiser "D") about 1930, and cruiser "E" in 1931. This gives Germany five new cruisers which, says an official statement, "must suffice us, whether we like it or not, as crews cannot be provided for more than that number."

Torpedo Craft.

Twelve of the oldest torpedo boats are being replaced by new vessels, classified in Germany as "large torpedo boats." Of the latter, four, the Möwe, Seeadler, Greif, and Falke, are now complete; four more, the Albatros, Kondor, Iltis, and Wolf, are due to follow during 1928–29; and the last four were launched at Wilhelmshaven in March and are named Tiger, Luchs, Jaguar and Leopard. They are all craft of about 800 tons with an armament of three 4·1-inch guns and four torpedo tubes, but the latter boats are understood to have improved underwater design which it is expected will give increased speed. Twelve older torpedo boats are being thoroughly overhauled and brought up to date.

Target Ship.

The old battleship Zahringen has been converted into a target ship to replace the Baden. The ship has been filled with cork and the upperwork altered to give her the appearance of a "Deutschland" class battleship. Her boilers are fired automatically with oil fuel and will drive her for some hours. In the event of a breakdown, warning rockets are fired and the engines automatically stop.

Wireless transmission from the distantly controlling escort starts, stops, and regulates the engines, steers the ship, switches on searchlights, ignites flash charges, or starts smoke clouds.

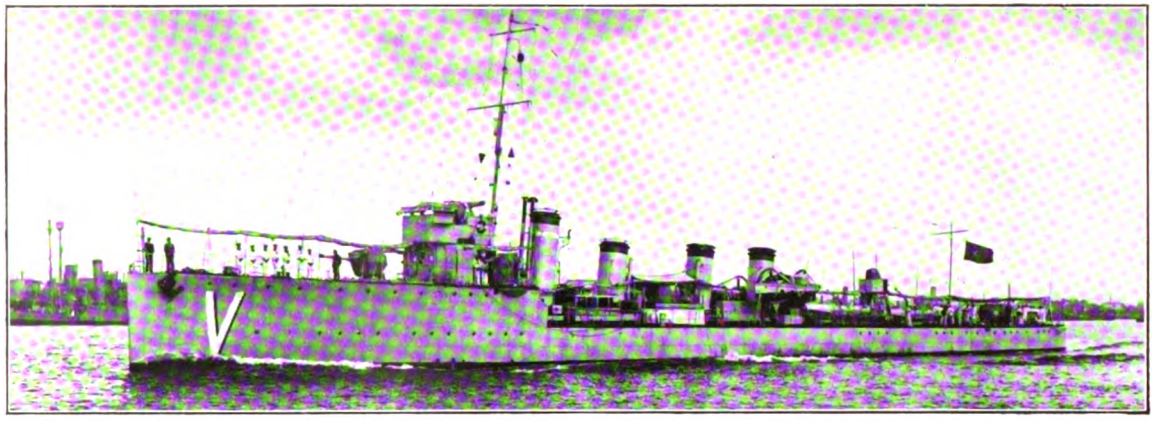
General.

Vice-Admiral Mommsen has been succeeded by Vice-Admiral Oldekopf as Commander-in-Chief of the Fleet; and Vice-Admiral Raeder has been appointed Chief of the Navy Department in the Ministry of Defence in place of Admiral Zenker who has retired.

It is of interest to note that Germany, while strengthening her navy, is also adding greatly to her mercantile marine. In the earlier part of the year she had 91 merchant vessels of 444,000 aggregate

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SPANISH DESTROYER VELASCO, 1,145 TONS.



SPANISH DESTROYER ALSEDO, 1,145 TONS.

(*Photographs by Stephen Cribb, Southsea.*)

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tonnage building, while the North German Lloyd is continually widening its influence by purchasing shares in other shipping concerns.

SPAIN.

The past year may be said to have witnessed a definite revival in the naval power of Spain. Exercises on a large scale were held in October for the first time for several years. These exercises took place off Alicante, and were under the command of Admiral José Rivera, who had under his orders a force of about thirty units, including nine submarines, and excluding a number of aircraft. This constituted the finest Spanish fleet to take the sea for many years. H.M. the King of Spain hoisted his Royal Standard, and accompanied the fleet throughout the manœuvres, the objects of which have not been divulged.

The *Times* Correspondent at Madrid, writing on October 11, 1928, said: "These manœuvres will mark the revival of the Spanish Navy and the emergence of the most powerful fleet Spain has possessed since the naval disaster accompanying the loss of the colonies."

Other notable events of the year were the cruise of King Alfonso to Stockholm, to visit the King of Sweden, in the cruiser Principe Alfonso, in September; and the visit of the King and Queen to a submarine flotilla at Santander in August, when they went on board one of the submarines and were present during diving exercises. The Principe Alfonso called at Portsmouth from September 22 to 26, 1928, where her appearance created a favourable impression. A division of new destroyers under Captain Salvascarvia Caravaca, the Alsedo, Velasco, and Juan Lazaga, visited Portsmouth during the first week of August, and their ships' companies were entertained there and at Cowes Regatta. They had on board a number of cadets from the Naval School.

A decree, signed by the King of Spain on May 16, authorised putting in hand a new naval construction programme. Exact details of this are not yet made public, but it is probable that those given in last year's "Annual" represent the main features. Spain has now entered the list of Powers which are building cruisers of the standard Washington type, of 10,000 tons and an armament of 8-in. guns. Two such ships, the Baleares and Canarias, were laid down at Ferrol on August 15 last, and their design is stated to be similar to that of the British Suffolk class.

Two flotilla leaders have been authorised to replace those sold to the Argentine Navy.

The old cruiser Princesa di Asturias has been withdrawn from Morocco and put out of commission.

A "General Directorate of Operations" with naval staff officers under a Vice-Admiral has been substituted for the Naval Staff, while the sea-going fleet has been re-organised and placed under another Vice-Admiral. The various units, including the aircraft carrier Dedalo, join up for three months for exercises; during the rest of the year they are at their naval bases for instructional work.

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OTHER FOREIGN NAVIES.

EUROPEAN.

(Arranged Alphabetically.)

Belgium.

As a result of the disbandment of the Belgian Navy, as a fighting force, in March 1927, the only ship now retained in commission is the fishery protection vessel Zinnia, an ex-British sloop, manned by civilians.

Denmark.

In spite of political efforts to reduce the Danish Navy to a kind of coast-guard force, patriotic opposition has prevailed up-to-date, and no drastic changes have been effected.

During last summer the training ship Hejmdal, on one of her instructional cruisers, visited Oban.

Six seaplanes of the German Heinkel type, fitted with English 400 h.p. Jaguar engines, are being tried, with a view to replacing the Brandenburg type. If successful a number of the machines will be constructed under licence in Danish naval workshops.

Greece.

Affairs in Greece have become more stable during the past year. Under the guidance of the British Naval Mission, the contract of which was renewed in March 1928, until March 14, 1929, naval development has proceeded steadily. The urgent need for economy precludes any immediate project for adding to the fleet beyond new construction mentioned in last year's "Annual." In a report on the exercises of 1927, Captain C. E. Turle, the Head of the Mission, stated that he was fully satisfied with the progress made.

A deadlock seems to have been reached with regard to the half-built battle-cruiser Salamis. Originally ordered at the Vulkan Yard, Stettin, this ship was launched in 1914 but had not received her main armament before the outbreak of the war. Her four 14-inch turrets, constructed in America, were purchased by the British Government and used for the big monitors Abercrombie, Havelock, Raglan, and Roberts. At the end of 1927 the case was referred to the Hague Court, which appointed a neutral arbitrator, the Dutch Admiral Sourie, who decided that Greece was bound by her original contract. The sum involved is about £1,000,000, half of which has been paid; but she wishes to abandon the ship, which is already obsolete in design and which she would have difficulty in manning, rather than pay the balance.

Further arbitration by the Norwegian Admiral Scott Hansen resulted in his reporting that the ship did not comply with modern requirements, but on the question of equity he was unable to suggest an ideal solution.

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Netherlands.

The six new destroyers for the Netherlands Navy have been designed by Messrs. Yarrow & Co., and are building under the supervision of that firm at Rotterdam and Flushing. The first of the group, the Evertsen, carried out her trials at the end of last year, and, with a full load, exceeded her contract speed of 34 knots. During the summer of 1928, a later ship of the class, the Piet Hein, attained 36·1 knots. These destroyers are intended for the Dutch East Indies.

An order has been given to the de Schelde Yard, Flushing, for a new submarine, O.12, which will be a vessel of 568 tons on the surface, with a speed of 15 knots, and of 8 knots when submerged.

Norway.

Owing to financial exigencies, the somewhat ambitious programme outlined in last year's "Annual" has been held up, and, at present, the only new construction actually on the stocks is two small submarines and a fishery protection vessel.

200,000 kr. has been voted for new aircraft for the naval air service.

Poland.

A party of petty officers has been sent to France for a course of instruction in submarines. Volunteers for a Naval Mission to Poland have been called for amongst Lieutenants and Lieutenant-Commanders in the French Navy.

Soviet Union.

The Soviet naval authorities have been making considerable efforts to improve the condition of their fleet. The three battleships, Marat, Paris-Commune, and October Revolution, have been refitted and are now considered to be in a satisfactory condition. The battleship Michael Frunze has also been taken in hand and was due to rejoin the fleet by the end of 1928.

The cruiser Profintern has been fully armed and is alleged to have attained a speed of 30 knots on trials, but this is probably an exaggeration.

At the end of the summer cruise eight destroyers were reported to be in satisfactory condition, the remainder require extensive repairs. Eight submarines are said to be efficient for defensive duties.

A fleet consisting of the three refitted battleships, the cruiser Komsomoletz, nine destroyers, and three auxiliaries, left Kronstadt on August 6, and carried out exercises in the Baltic until August 14. It is also reported that four Soviet submarines were exercising off the Swedish coast.

A squadron consisting of the cruiser Chervonaya-Ukrainia and the destroyers Petrovski, Shaumya and Frunze, escorted the Afghan King, Amanullah, from Constantinople to Batoum at the end of May.

There are indications of increased efficiency in the Soviet Navy, but until it has shed its political incubus there is little prospect of

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it reaching the standard of the navies of nations with a more civilised form of government.

SWEDEN.

The following comparison between the design for the new coast defence ships and the present Sverige class is of interest :

	New type.	Sverige class.
Displacement	7,520 tons	7,400 tons
Length	426 ft.	393 ft.
Beam.	61 ft.	61 ft.
Draught	20 ft. 6 in.	20 ft. 5 in.
Speed	24 knots	22–23 knots
Armaments	Four 11-in.	Four 11-in.
	Six 6-in.	Eight 6-in.
	Four 3-in.	Six 3-in.
	(No torpedo tubes)	Two 18-in. torpedo tubes
No. of Armoured decks	Two	One

Details are now available of the design for a new aircraft carrier. The ship is to be 472 ft. long, 48 ft. beam and to displace 5,400 tons. She is to have a speed of 28 kts. and carry eight machines. The armament will be six 6-inch guns in double turrets ; six 3-inch guns and two triple revolving 21-inch torpedo tubes. She will also be fitted to carry 100 mines and there will be two catapults.

Fleet exercises on an unusually extensive scale and under the personal supervision of the King of Sweden, were carried out within the Stockholm archipelago and adjacent waters during August.

TURKEY.

The two submarines Birindji-in-Uni and Ikindji-in-Uni, built at Rotterdam were duly delivered at Constantinople on June 9. They are the first vessels built for the Turkish Navy since before the war. Some difficulty is being experienced in finding efficient personnel to man these craft.

YUGOSLAVIA.

The first two submarines for the navy of Yugoslavia, the Hrabri and Vebojaa, accompanied by the depot ship Hvar arrived at Cattaro from England on April 8. Built by Messrs. Armstrong Whitworth & Co. on the Tyne, they displace 975 tons and are armed with two 4-inch guns and six 21-inch torpedo tubes.

SOUTH AMERICAN.

(Arranged Alphabetically.)

ARGENTINE.

The programme of new construction approved in principle by Congress, and detailed in last year's "Annual," is being proceeded with. Two new cruisers, ordered in Italy, were laid down in October and November 1927, and have been given the names Almirante

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Brown and 25 de Mayo. A third cruiser is projected but not yet ordered.

Three flotilla leaders, the Mendoza, Tucuman, and La Rioja, are building at Messrs. J. S. White's works at Cowes. The first was launched on July 18, the second in October 16, the third is in hand.

Two sloops, details of which were given in last year's "Annual," have been completed by Messrs. Hawthorn Leslie.

The order for three small submarines has gone to Italy, where they are building. Over and above the new construction approved, Argentine has acquired two flotilla leaders, purchased from Spain. Known originally as the Churruca and Alcala, these have been renamed the Cervantes and Juan de Garay.

The Naval Air Service is to be expanded and the bases at Puerto Belgrano and Punto Indio equipped. Two small dirigibles have been reconditioned, and flying boats ordered from the Supermarine Company, Southampton, and seaplanes from the Fairey Aviation Company, Hayes.

Brazil.

The monitor Maranhao is reported to be undergoing conversion to a gunboat-scout to be renamed the Espirito Santo. The work is being done in the yard at Rio. There are no important matters to record in regard to this country's Navy.

Chile.

A new British Naval Mission has succeeded that appointed two years ago. Its members include two Commanders and three Lieutenant-Commanders, R.N., among them specialists in submarine work, signals, gunnery, and torpedo.

Certain aspects of the reorganisation of the Navy and its higher administration, which were indicated in last year's "Annual," are still under consideration.

New Construction.—The first of the six destroyers building by Messrs. Thornycroft at Southampton, the Serrano, has been completed. At the latter part of 1928, the following was the condition of the remaining five: Orella, on trials; Riquelme, launched; Hyatt, launched; Videla, launched; and Aldea, on the slips.

An order for three submarines has been given to Messrs. Vickers-Armstrong, and the first one, named Capitan O'Brien, was launched on October 2, 1928.

The Naval Air Service is being developed as an integral part of the Navy, a Squadron Leader, R.A.F., being attached.

Peru.

The small submarine programme is proceeding steadily and the second pair of these craft, R.3 and R.4, were due to be delivered by the Electric Boat Company, U.S.A., during 1928. Two more, R.5 and R.6, are projected, making six in all.

E. Altham,
Captain, C.B., R.N.

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CHAPTER III.

Comparative Strength and Distribution

Events of the past year have illustrated in a marked degree how difficult it is to arrive at a common basis, of general acceptance, for the assessment of naval strength, and how diverse are the standards of comparison which appeal to the different nations, owing to their varied requirements in regard to oversea communications, or sea frontiers, or both. What it was hoped would prove a step forward, when France agreed to give up her insistence upon a tonnage basis for the computation of naval strength in bulk, and adopted the British method of comparison according to categories of ships, only served to provoke more controversy, and to stiffen the adherence of the United States to their idea of a " global " tonnage allotment for each Power. Italy also signified her support of the proposal for a total tonnage allowance for each country. In an invitation to the nation to observe " Navy Day " on October 27, 1928, Mr. Wilbur, Secretary of the United States Navy, said : " This country stands for the limitation of naval armaments complete in all types of ships, with total quotas small enough to assure moderate expenditures —all on the basis of America having parity with any other country."

Unfortunately, this method of " total quotas " is misleading, for it takes no account of the powers of individual ships—to say nothing of the varied functions they may have to perform in defence schemes —although in the end regard must certainly be paid to the various attributes of war worthiness, such as gun-power, speed, endurance, age, and the like. The " global " tonnage principle is also difficult of application. If nations and navies were all beginning afresh to build up from nothing, or if their aims were towards naval expansion, an agreement to keep within a specified aggregate tonnage might have its advantages. The actual situation is altogether different. The Powers, in estimating their requirements for the immediate future, are encumbered with fleets as they are to-day, with ships of a most varied nature, of all ages, sizes and conditions, and often built for purposes totally different from those which they might be called upon to fulfil in case of war. All this tonnage cannot be scrapped forthwith and new substituted, yet it all counts in every comparative table.

There is one Power which stands apart from all the rest in this respect, and that is Germany. For her the limited amount of tonnage allowed at the signing of peace has become a fixed quantity. But it is an actual and material figure, not a hypothetical one, nor

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a maximum which might be worked up to in various ways. Whatever new tonnage is produced by Germany, it takes the shape of replacements of actual vessels, and the important point is that limitation applies to the size and gun-power of individual ships as well as to the aggregate tonnage. There is no question, for example, of two old vessels being scrapped to permit of the building of one larger and more powerful new ship. As a result of the influence exerted by the Versailles Treaty, the incentive in German warship construction at present is in the direction of improving the efficiency and power of the individual ship. Germany is virtually building up an entirely new fleet, new not merely in point of age but in its types of vessel, in a manner which commands respect, if not admiration. Her new fleet challenges comparison with any other of like tonnage.

Elements of Warship Strength.

When the late Sir Nathaniel Barnaby declared that the fairest available approximate measure of the power of a warship is her displacement or total weight, on the ground that it represents power of some kind, he could scarcely have visualised such a situation as that now presented in the German dockyards, where the naval architects and marine engineers, taking the Treaty limitations in displacement as their starting point, have striven to improve designs to such an extent that they have evolved altogether new types of medium-sized vessels. By the adoption of every means for saving weight, such as welding instead of rivetting, and by utilising advances in engineering efficiency, there is crowded into these new ships a measure of fighting power such as is not found in any ships of corresponding tonnage elsewhere. In this way is technical progress stimulated. The performances of the new classes will be closely watched. If the new 6,000-ton cruisers of the Karlsruhe class, to which it has been possible to give nine 5·9-inch guns and twelve torpedo tubes, and a maximum speed of 32 knots, prove satisfactory on service, they will lend material support to the argument for medium-sized cruisers for trade protection and general service which Great Britain advocated at Geneva.

The same remark may be made in reference to the 10,000-ton "armoured cruiser A" which the Deutsche Werke received orders to start in their Kiel shipyard in August 1928. This is the first of four armoured vessels with which it is proposed, within the provisions of the Peace Treaty, to replace four out of the six old battleships left to Germany. Admiral Zenker in 1926 expressed the view that such vessels could be no more than coastal defence monitors, but details now revealed show that, in relation to existing German battleships, they are in reality battle cruisers. With 11-in. guns, they are strong enough to beat off post-Washington cruisers (limited to 8-in. guns), and are capable, by reason of their 26 knots' speed, of declining action with any existing armoured ships except such as the Hood. It is beyond the scope of the present article to enter into comparisons of the later designs of ships, but it is pertinent to note that the medium-sized cruiser is also

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making its appearance in Italy, where a group of four 37-knot ships is building, for the Royal Italian Navy, and where also the Orlando firm is to build two 6,000-ton cruisers for the Argentine Republic.

No changes have occurred during the past year in the effective lists of capital ships. Neither France nor Italy exercised the right they had under the Washington Treaty to lay down in 1927 a battleship up to 35,000 tons displacement for replacement purposes. These two Powers also have the right to lay down a battleship each, if they desire, during 1929. Great Britain, the United States, and Japan cannot do so until 1931, when they may begin the construction of two, two and one ships respectively.

In replying to the British Note of July 28, 1928, respecting the Anglo-French compromise, the Italian Government, on October 6, 1928, suggested that one means of furthering the cause of the limitation of armaments would be for the five signatory Powers of the Washington Treaty to undertake to postpone until after 1936 the construction of those capital ships which the Treaty would allow them to lay down during the period 1931–36. "For their part," said the Note, "the Italian Government would be prepared to undertake this engagement provided that it was also simultaneously accepted by the other signatory Powers." Italy clearly has no great liking for battleships, and would be glad to be relieved of the burden of having to construct any in the near future to maintain the *status quo*.

Additions to the completed lists of aircraft carriers were made by the commissioning of the British ex-cruiser Courageous, and the United States ex-battle-cruisers Lexington and Saratoga. Out of the allowance of 135,000 tons (137,160 metric tons) in aircraft carriers for each Power, Great Britain now has 99,100 tons completed and the United States 78,700. The former total includes the two small seaplane carriers Ark Royal and Pegasus. The Pegasus was in 1928 ordered to be placed on the sale list, and the Ark Royal is in reserve and not utilised for flying duties. Towards her allotment of 81,000 tons (82,296 metric tons) in aircraft carriers, Japan has now 57,675 tons, including the old seaplane carrier Wakamiya (completed 1901). The completion of the Kaga would give her 84,575 tons, or 78,700 tons excluding the Wakamiya.

Cruiser Tonnage Completed.

The principal change in the effective lists of ships of the Powers during the past year has been caused by the completion of seven cruisers for Great Britain, the five Kents for the Royal Navy and the Australia and Canberra for the Australian Fleet. In anticipation of the entry of these ships into service, certain obsolete types had already been scrapped. In addition, the Yarmouth was in October ordered to prepare for sale, and the Melbourne was likewise on the disposal list, but for the present they are included in the British total.

When the Admiralty's proposal to resume cruiser building, after a lapse of six years, was first announced in 1924, it was criticised on the ground that it was calculated to lead to a recrudescence of

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naval rivalry, not, as in the past, in regard to capital ships, but as regards cruisers for commerce protection. Reviewing the position five years later, it cannot be said that this forecast was justified. There is no rivalry in such modest amount of cruiser building as is now going on for the Powers. It is purely dictated by the need for replacing obsolete ships. France and Italy have been laying down cruisers at the rate of one a year, and Japan at the rate of two a year. The United States laid down ten cruisers in the three years 1918–20, then went five years without any, then began eight in the two years 1926–27 (or at the rate of four a year), and proposes to increase this latter rate by laying down fifteen cruisers in three years, 1929–31. If there is any sign of competition it is not indicated on the European side of the Atlantic.

The United States cruiser total declined in the past year by one, owing to the scrapping of the Pueblo (completed 1905), and the absence of any new ships coming into service during 1928. The Japanese completed total remains unchanged (25). France shows a net gain of two, having completed her first three 10,000-ton cruisers, the Duquesne, Tourville, and Suffren, and lost one by the scrapping of the Victor Hugo (completed 1907). The Italian total remains stationary at 12 ships, as although the Trento and Trieste, the first 10,000-ton cruisers, have been brought to the trial stage, the small scout-cruisers Marsala and Nino Bixio (completed 1914) have disappeared from the list. Incidentally, the French and Italian changes show the necessity for the cautious handling of numbers of ships only when comparing relative naval strength. France lost during the year the 12,400-ton armoured ship Victor Hugo, with 7·6-inch guns, and Italy the 3,518-ton unarmoured ships of the Marsala type, with 4·7-inch guns ; but each counts as one in a comparative table.

Torpedo Craft Totals.

In the lists of flotilla leaders and destroyers, there is again to be noted a falling off in the British and Japanese totals, the British from 176 to 165, and the Japanese from 116 to 101, whereas no change has occurred in the United States total (276). This is because, in spite of the completion of new vessels, the Anglo-Japanese flotillas have lost still more units which have become obsolete owing to age, whereas the United States total includes chiefly vessels produced in the last year of, or immediately after, the late war. The total of 276 (which does not include 25 assigned to Coast Guard duties) more than equals the combined totals of Britain and Japan. Activity is being continued by France and Italy in the building of flotilla leaders of from 2,000 to 2,600 tons, with speeds up to 38 knots. These will be remarkable vessels. The question of classifying flotilla leaders presents points of doubt. The United States and Japan place all their ships of this type in the destroyer category, although they go up to 1,700 tons, as compared with the 1,550 tons of the British flotilla leaders of the Broke class. It is entirely a matter of choice. In regard to submarines, Great Britain, which has dropped to fourth Power numerically, is recovering some of her lost

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ground now that six vessels are being built annually, but larger submarine programmes are also in hand for Japan, France, and Italy.

The fleet which has undergone most modernisation, in relation to its size, is that of Spain. The armoured cruiser Princesa de Asturias, completed in 1902, has been removed from the effective list, and the much more efficient cruiser Principe Alfonso, which was seen in British waters during the year, has taken her place. The latter vessel is the first of three cruisers which are similar in general design to the Enterprise class in the British Navy, with the advantage that they carry an additional 6-in. gun. There are three other smaller cruisers of post-war design now in service for Spain, and the total of six is more than France and Italy yet possess.

No changes of importance have taken place in the composition of the navies of Northern European Powers. Sweden has removed her coast defence battleship Dristigheten (completed 1901) from the effective list.

Fleet Distribution.

No radical changes in the distribution of the world's fleets have occurred during the past year. The movement of forces towards the Far East owing to the situation in China, during 1927, proved to be only transitory. The international squadron at Shanghai or in the neighbourhood early in 1928 presented many points of contrast. Three types of British cruisers were to be seen there, the Vindictive, Durban, and Curlew, the last-named ship being immobilised throughout the winter of 1927–28 at Hankow. The flag of the United States Admiral flew in the Pittsburg, a pre-war armoured cruiser, and that of the Italian Admiral in the Libia, a pre-war light cruiser. The Japanese squadron presented many contrasts in itself, the cruisers ranging from the post-war vessels Nagara and Kuma, of 5,500 tons and 5·5-inch guns, down to the Tsushima, completed in 1904, of 3,430 tons and 6-inch guns of older design. The smaller craft were of various shapes and sizes. In the autumn of 1927, the French cruiser Primauguet, the U.S. cruiser Marblehead (both of which went up to Hankow), and the British cruiser Vindictive afforded an interesting comparison in cruisers of large size but of pre-Washington design.

Home and Atlantic.

During 1928, the new French cruisers Lamotte-Picquet, Duguay-Trouin, and Primauguet were transferred from the Second Light Division in the Channel to the Third Light Division in the Mediterranean. The composition of the Second Squadron of the French Navy, based on Brest, now includes the Second Light Division, consisting of the cruisers Strasbourg, Metz, and Mulhouse; the Fourth Light Division, in which are the new flotilla leaders Leopard and Lynx; the Second Destroyer Flotilla, composed of one leader and twelve destroyers; and the Fourth Submarine Flotilla, in which are seven submarines. Various small craft for training and auxiliary purposes are attached to the First Maritime Region, Cherbourg,

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(*Photograph by Stephen Cribb, Southsea.*)

SPANISH CRUISER PRINCIPE ALFONSO, 7,850 TONS.

(*Visited Portsmouth and Stockholm*, 1928.)

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and the Second Maritime Region, Brest. In October 1928, the new 10,000-ton cruisers Duquesne and Suffren were commissioned for trials at Brest, and the Tourville at Lorient.

The German naval forces in home waters consist of four battleships, four cruisers, and the Second Flotilla (with the Wolf as leader) in the North Sea; and four battleships, four cruisers, and the First Flotilla (with T. 196 as leader) in the Baltic. The new destroyers Falke (senior officer), Mowe, Greif, Albatros and Kondor now form the fourth half-flotilla of the Second Flotilla, replacing the older destroyers, T. 196 and the like. The Russian Active Fleet in the Baltic includes three battleships, the Marat (flagship), Paris Commune, and October Revolution; two cruisers, the S.S.S.R. (ex-Aurora), which is a sea-going training ship for officers, and the Profintern (ex-Svietlana); eleven destroyers, with their depot-ship Lovat; nine submarines; and three minelayers, with certain auxiliary craft.

No changes of consequence have been reported in the composition of the fleets of Denmark, Norway, and Sweden. The last-named now maintains a Coastal Fleet (April to October), consisting of three coast-defence ships, the Sverige (flagship), Drottning Victoria, and Manligheten; a destroyer division of four vessels; a torpedo boat division, three vessels; and two vedette boats. The submarine flotilla includes six vessels, with the depot ship Svea; and there is a target division, with the Freya as depot ship; and a signal school division of three vessels.

On her Atlantic seaboard, Spain had since the War greatly improved the composition of her "Sea-going Squadron." It has now two battleships, the James I. (flagship) and the Alfonso XIII.; a Cruiser Division, composed of the Reina Victoria Eugenia, Don Blas de Lezo, and Mendez Nunez; and a Destroyer Flotilla in which are the new vessels Alsedo, Velasco, and Juan Lazaga, and to which the new flotilla leaders are to be drafted on completion. Under direct orders of the Admiralty in Madrid are the cruisers Cataluna and Principe Alfonso, and the Almirante Cervera is to join them when ready for service. The Cataluna has been employed as a cadets' training ship. During 1928, the picturesque new training vessel Juan Sebastian el Cano made her first world cruise. She is a four-masted, schooner-rigged ship, with square sails on the foremast, and was scheduled to visit Capetown in October, Adelaide, Melbourne, and Sydney in December, and Fiji in January 1929.

Fleets in the Mediterranean.

The First Squadron of the French Navy now consists of six battleships, of which three—the Provence, Lorraine, and Bretagne—are manned by full crews, and the others are the Jean Bart, Paris, and Courbet, which were placed in reserve commission from October 1, 1928. The Provence flies the flag of the Commander-in-Chief, and the Jean Bart that of the Rear-Admiral. In the First Light Squadron there are two divisions. The Third Light Division consists of the Lamotte-Picquet (flagship), Duguay-Trouin,

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and Primauguet; and the Fifth Light Division of the flotilla leaders Panthere (senior officer), Tigre, Chacal, and the aircraft carrier Bearn. The destroyer flotillas, of which the Jaguar is the flagship of the Rear-Admiral Commanding, include three flotillas. The First Flotilla has the Amiral Senes and eight destroyers, the Third the Sirocco and seven destroyers, and the Fourth the Chartang and seven destroyers. The new destroyers Le Mars, Le Fortune, La Palme, and La Railleuse have been drafted into the Third Flotilla, during 1928. Also under the Admiral of the First Squadron is the Third Submarine Flotilla, of nine vessels. The Third Squadron is a training and auxiliary force, based on Toulon, and may be compared to the Reserve Fleet of the British Navy. The battleship Condorcet flies the flag of the Vice-Admiral Commanding, and the Voltaire, with a four-fifths crew, has the flag of the Rear-Admiral Commanding, Third Division of the Line. The cruisers Gueydon, Thionville, and Ernest Renan also form part of the Third Squadron, but the Marseillaise has been scrapped. There is a Levant Division, consisting of the Baccarat, Montmirail, and Lievin, the armed yacht Diana (which returned from Indo-China in 1928), and a refrigerating ship. Patrol and other craft are attached to the Third Maritime Region, which has its headquarters at Toulon.

Italy's First Squadron is based on Spezia, and its normal cruising area is the Tyrrhenian Sea. The Ancona is the flagship, and there is a Cruiser Division consisting of the Bari, Taranto, and Premuda; and Destroyer and Submarine Divisions of which the Quarto and the depôt-ship Pacinotti are the respective flagships, about eighteen destroyers and thirty-eight submarines being attached to them. Also attached to the First Squadron is the aircraft carrier Miraglia.

The Italian Second Squadron is based on Taranto, and exercises in the Ionian Sea. It has a Battleship Division of five ships, with the Doria as flagship, but only three are in full commission. The Second Destroyer Division includes the Venezia and eighteen other units, and six destroyers in reserve. Another force is the Special Division, which has its exercise ground in the Adriatic. In this is the cruiser Brindisi as flagship, the flotilla leader Aquila, nine destroyers, two minelayers, and seven submarines.

Italy's Colonial forces include a Tripoli Squadron, which in 1928 included the destroyer Pola and a gunboat; a Cirenaica Squadron, with the Pontiere as stationaire ship at Benghazi (it was expected she would soon be replaced); an Indian Ocean Division of two small craft; the sloop Lepanto in the Red Sea; and the Ægean Squadron in which is the gunboat C. del Greco and two minesweepers. In the Spezia Command during 1928 was the cruiser Pisa as flagship, the training ship Colombo (which was seen at British ports in the course of her oversea cruises), the new cruiser Trento and the flotilla leader Tigre. Included in the Naples Command is the Amerigo Vespucci as training ship. The Maddalena Command has a destroyer flotilla of six boats and two minelayers, and the Messina Command one of three boats and seven minesweepers. At Taranto, several small craft are employed for duties connected with the "School Command." The Brindisi and Venice Commands include

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only small craft. At Pola are the cruiser San Marco, the new cruiser Trieste (completing), the light cruiser Nino Bixio, and torpedo craft.

Spanish naval forces in the Mediterranean include small destroyer and submarine divisions at Cartagena. At Barcelona there is the Naval Aviation School, to which the cruiser Rio de la Plata, the aircraft carrier Dedalo, two torpedo boats and three motor launches, are attached.

The Greek Navy has in commission a Training Squadron, composed of the battleship Kilkis as flagship of the Commander-in-Chief, five destroyers, three torpedo boats, and an oiler. Three submarines, the sloop Nautilus (for hydrographic duties), and the repair ship Ephestios (late Chios) are also in commission. The cruiser Averoff is in reserve, as are six torpedo boats. The battleship Lemnos is refitting at the Piraeus, and the cruiser Helle in France.

Information concerning the Soviet Forces in the Black Sea is scanty. The exercises in the autumn of 1927, which included a bombardment and "gas attack" on Odessa, were not repeated in 1928. There are two cruisers in the Black Sea, the Chevonaya-Ukrainia, which serves as flagship, and the Komintern; and a few torpedo craft.

Eastern Waters.

On November 6, 1928, the new destroyers De Ruyter and Evertsen, completed a few months earlier at Flushing and Rotterdam, arrived at Colombo on their first cruise to take up duty with the Dutch Indian Military Marine. This force also has two gunboats, six minelayers, three torpedo boats, thirteen submarines with the depot ship Pelikann, three surveying vessels, and two cable ships. The Royal Netherlands Navy Squadron in the East Indies includes the coast defence ship De Zeven Provincien, which serves as gunnery schoolship at Sourabaya; the cruisers Java and Sumatra; the destroyers Panter and Vos, and the gunboats Flores and Soemba.

In the course of her training cruises, the German cruiser Berlin was seen in Indian waters during 1928. She visited Bombay in January, Trincomalee and Rangoon in February, and after a voyage to Australia was at Colombo and Karachi in November and Aden in December.

The Far Eastern Division of the French Navy consists of the cruiser Jules Michelet as flagship, and six despatch vessels. There is a Yangtse Flotilla of four gunboats, and two other gunboats are on the West River. The Indo-China Division includes three surveying ships, two minesweepers, and two submarine chasers. Italy maintains in the Far East the cruiser Libia, senior officer's ship, two gunboats, and the destroyer Muggia.

There were no changes of importance during 1928 in the composition of the Japanese squadrons and flotillas in commission. At the moment of writing, the new cruisers Nachi and Myoko, the first of 10,000 tons, have not been assigned to the active Fleet. The last cruisers to be completed for service, the 7,000-ton ships Aoba and Kinugasa, have joined the Fifth Squadron, Second Fleet, where they

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are in company with their sister ships the Kako (flagship) and the Furutaka. In this Fleet, the battle cruisers Kongo (flagship) and Hiyei form the Fourth Squadron; the cruiser Natori (completed 1922) is the flagship of the Second Destroyer Squadron (fifteen destroyers); and the depot ship Chogei (launched 1924) is flagship of the Second Submarine Division (seven submarines).

In the Japanese First Fleet are the battleships Nagato (flagship of the Commander-in-Chief), Mutsu, Fuso, and Hyuga, that is, two 16-inch-gun ships and two with 14-inch guns. There is a Third Squadron of three cruisers, the Akukuma (flagship), Naka, and Jintsu. The cruiser Tenryu is flagship of the First Destroyer Squadron (sixteen destroyers), and the depot ship Jingei (a sister-ship of the Chogei, already mentioned) is flagship of the First Submarine Division (six submarines). A new "First Aircraft Carrier Squadron" has now been formed, consisting of the Akagi (flagship) and Hosho, with the attached destroyers Ume and Kusunoki.

The First Foreign Service Squadron of Japan is stationed in the Yangtse. It includes the cruisers Tone (flagship) and Yahagi, nine destroyers, and nine river gunboats. The Second Foreign Service Squadron has also been in China waters during recent months. This includes the cruisers Tsushima (flagship) and Kuma, and about four destroyers.

At Yokosuka, several craft are attached to the gunnery, torpedo, engineering, and seamanship schools; at Kure, there is the submarine school; at Sasebo, a number of vessels are in reserve; and there are minor naval stations at Maidzuru, Ominato, Bako and Chinkai.

The United States Asiatic Fleet consisted during 1928 of the cruiser Pittsburg as flagship; the Second Light Cruiser Division composed of the Trenton (flagship), Memphis, and Milwaukee; and the gunboat Sacramento. In the Yangtse Patrol, the Luzon replaced the Isabel as flagship, and the Asheville became senior officer's ship on the South China Patrol in succession to the Helena. There were three destroyer divisions with the Fleet, Nos. 39, 43, and 45, each consisting of six destroyers, and also the Paul Jones as flagship and the Black Hawk as leader.

In the Pacific, no vital changes occurred in the composition of the United States Fleet. The U.S.S. Texas, flagship of the Commander-in-Chief, was detached from the Pacific to the Atlantic until early in 1929, and in October 1928 was reported at Havana, Cuba. The new aircraft carrier Lexington was ordered to be based for the time being at San Diego, California. The organisation of the Fleet as a whole is published regularly in the American Service Press, and there is no need, therefore, to summarise it here.

G. H. HURFORD.

*** Tables of Comparative Naval Strength will be found on pp. 369–374, after the Dimensions and Particulars of British and Foreign Warships.

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CHAPTER IV.

Historical Observations on Japan's Naval Policy.

This democratic age of ours demands frank and open discussion of any ideas, and the judgment of public opinion must be passed before they are put into practice. This principle, when applied to international relations, would eliminate jealousy and distrust among nations and suppress tyrannical actions of the stronger, thus promoting peace of the world and happiness of mankind.

Japan, on account of her unique language and her isolated position, has experienced no little difficulty in expressing to the world her opinions and aspirations. Consequently, it was to be regretted that the history and tradition of the Japanese Navy, and its policy based upon them, were not understood by the Western nations. Therefore, it will not be fruitless, as a student, to review here the history of the development of her sea power in outline, and express my opinion of Japan's claim respecting her Navy.

A Short History of the Japanese Navy.

The history of the Japanese Navy can be divided into two distinct periods by the Restoration of Meiji in the middle of the nineteenth century. The period preceding that date saw Japan completely isolated in the Far East, having only China and Korea as her possible rivals, with no navy in modern sense, but a sea-force corresponding to that of England or other north European countries before the fourteenth century. Japan's Navy of to-day is, therefore, practically born at the great event above referred to in her history.

(1) *From the Dawn of History down to the Middle of the Nineteenth Century.*—Although Japan can trace her history back to the seventh century B.C., her insular and secluded position from the Asiatic Continent, as well as the chaotic condition of her big neighbour China, who was too busy with her internal troubles even in those early days to step outside of her boundaries, has left Japan comparatively uneventful during this interval. We can, however, count four wars in which she was engaged with outside Powers.

First of these is the expedition to Korea by the brave Jungu Kogo, Empress consort of Chuai, in order to punish the Koreans for instigating a revolt among the Southern tribes of Japan in A.D. 200. As the result of this expedition, Korea became a tributary to Japan and remained so for about four hundred years. Historical records are too scarce to give us exact knowledge as to the kind of ships employed at that time. But from the fact that they could

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weather the seas of the Korean Straits to accomplish the task of transporting the forces, they were not probably unlike those of the European vikings.

The second expedition was undertaken by Abe-no-Hirafu, who led his victorious army as far as the Rivers Tumen and Amur with nearly 150 vessels on three occaisons about A.D. 400. After that Japan used to send out troops to Korea whenever a rebellion was reported there. Thus Korea and the islands in the Straits offered theatres of struggles, as well as main points of contact, between Japan and the Continental states.

In 1281, Japan was first invaded by Khubla-Khan, the powerful warrior-king of Mongolia, who brought an army of 100,000 men strong on board three thousand ships-of-war. These ships are said to have resembled Chinese junks of large type used to-day, having pretty strong hulls and being armed with guns for stone projectiles. Japan had no warships to match them then, and she was almost at the mercy of the invaders, who repeatedly played havoc and depredation along the coast. Japan was in a state of terrible anxiety just as England was when the Spanish Armada threatened her. And this happy analogy is true even to the effect, for while the Mongolian ships were at anchor in one of the northern harbours of Kyushu, a tremendous typhoon, characteristic on the west coast of Japan, suddenly sprang up and wrecked them to pieces. Only a few vessels of this Eastern Invincible Fleet managed to get back to their home ports.

Lastly, another expedition to Korea was carried out by Toyotomi Hideyoshi beginning in 1591. It was necessary to prepare a great number of transports to send more than 100,000 soldiers and warships to escort them. Japan had no regular navy yet and had to organize one for the purpose by collecting suitable boats and building some in haste. Therefore it is not difficult to imagine how imperfect they were both in construction and in equipment. Hideyoshi's general plan was that, while the army, landing on the south coast of the peninsula, was fighting its way up north inland, the navy was to secure sea communication, pushing on side by side with the army. That army marched on without much difficulty and reached Seoul in less than a month, but the navy met with a powerful opposition. Korea had a very prominent admiral named Ri Shun-Shin, and some warships under his command were protected with copper plate armour. His skill in directing and manœuvring the fleet was beyond the capacity of the Japanese, who were entirely foiled in reaching the west coast of the peninsula, not to speak of advancing northward along it as scheduled. Meanwhile the army, which reached as far as Pheng-Yang, was defeated by the Koreans, now aided by a strong force of the Chinese, and was compelled to retire to the southern part of Korea, barely to resist the combined enemy there, until the fruitless expedition was recalled at the death of Hideyoshi. Japan learned the same lesson as Persia under Xerxes and Carthage under Hannibal long ago in the West, that an invading army in a peninsula could not be operated successfully without the navy on its side controlling the sea around.

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Although the principal naval campaigns in which Japan took part before the nineteenth century were only those above mentioned, there are some other sort of activities of her seamen that require a passing notice here.

During the fifteenth and sixteenth centuries, when the prestige of Ming dynasty in China began to decline, many Japanese people on the western sea-board equipped and armed private ships and went about plundering the Chinese coast. They were called the "Wako," and some of them reached as far as the Malay Peninsula and Cochin-China. They were, of course, no other than sea-rovers, but it will be recalled that regular navies of other countries likewise owe their origins to pirate-like vikings. They were, moreover, pioneers in colonisation, and at one time Japanese settlements were found in Formosa, Cochin-China, and the Philippine Islands.

It coincides with the time when the European nations began to make great development in navigation and colonisation, and Japan came under their influence. Portuguese, Dutch, and Spanish ships came to her ports one after another. In 1613 the first English ship came to Hirato, a port on the west coast of Kyushu, and opened a commercial house. Thus internally and externally stimulated, Japanese shipbuilding gradually developed, and in 1630, she built a big ship called Adaka-Maru, which had dimensions of 186 feet in length, 63 feet in breadth, and 12 feet in draught.

But unfortunately for the nation, the seclusion policy of the Tokugawa Shogunate nipped her naval development and oversea colonisation in the bud. By way of compensation, as it were, for two hundred and sixty years of unmolested peace, Japan lost all her ships from the ocean routes. The Shoguns, whose illustrious ancestor Iyeyasu had suppressed the internal troubles of Japan, bringing warring Daimyos under his control, were usually efficient administrators and could keep peace and order in the country by a very complicated but well-organised feudal system. But they were naturally short-sighted as to the affairs of the world outside and believed it absolutely necessary to keep the nation out of dangerous contact of foreign ideas, foreign religion, or foreign civilisation. Thus the stagnation of Japan's national expansion was the price she had to pay for the long peace unparalleled in the world's history.

From the middle of the eighteenth century onward, England and France began to appear on the Eastern seas after colonising India. Russia, too, marching out to the Pacific through Siberia, gave rise to complications with Japan concerning Sakhalin and the Kurile Islands, which were then undisputed Japanese possessions. Thus confronted with the general current of the world pressing her from all directions except the east, which was soon to be filled by another Power, Japan could no longer remain indifferent. One day she saw Russian ships coming to her northern border, pressing to open commercial relations, and the next she was annoyed by the visit of British ships to her south-western ports. It was at this time that a Japanese scholar, Hayashi Shihei, gave warning to the nation about the necessity of coast defence, by announcing that "the water of

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the River Sumida (which runs through Tokyo) communicates with that of the Thames," and was imprisoned by the happy-go-lucky Shogunate offended by his argument. But after America pushed her frontier to the Pacific coast toward the middle of last century, Japan had to deal with her across the ocean: this time the visitor came from the east in the person of Commodore Perry. Eventually Japan was completely surrounded by outside influences which compelled her to open the country without regard to her internal circumstances.

(2) *From the Middle of the Nineteenth Century down to the Present.* —As stated before, the development of the Japanese Navy of to-day comes in this interval, which can be divided into the following four periods:

The first: the period of creation of the Japanese Navy between 1853, the year of Commodore Perry's visit, and 1870.

The second: the period of naval rivalry between Japan and China from 1870 to 1894.

The third: the period of naval rivalry between Japan and Russia from 1895 down to the Russo-Japanese War of 1904.

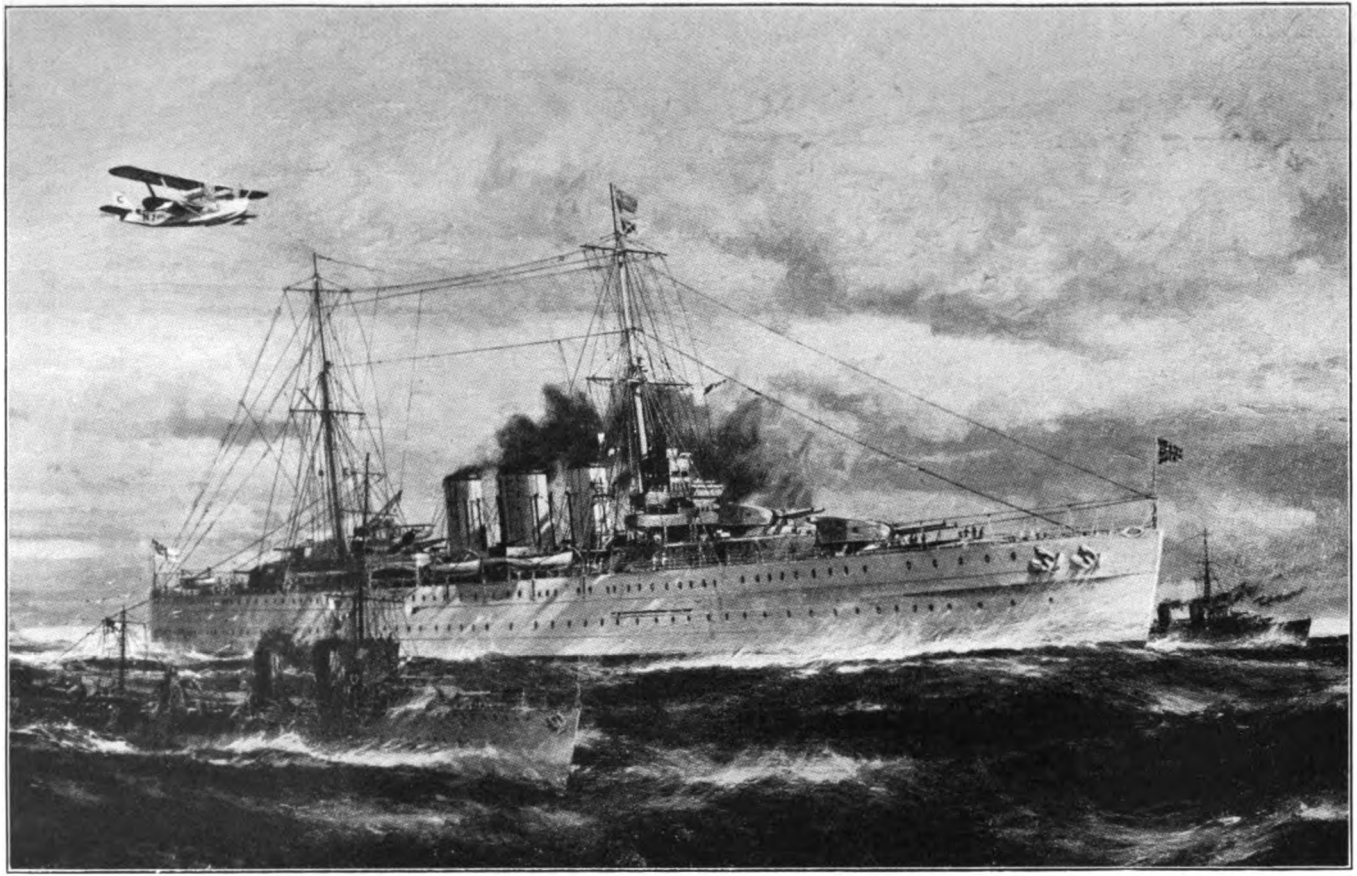
The fourth: the period of independent naval preparation from 1905 downwards.

Now, let me state briefly the naval situation in each of these periods.

The first period. Japan, awaking from her long sleep of seclusion and coming into international affairs, keenly realised the necessity of naval defence as an insular nation, and made strenuous effort to organise a navy without any particular object. Toward the end of the Tokugawa Shogunate, the government ordered each Daimyo to buy warships and invite European instructors to cultivate naval knowledge. After the Restoration, however, the new government requisitioned the warships which formerly belonged to the Shogunate and the Daimyos, and thus the foundation of the organised navy was laid. The strength of the Imperial navy in 1872 consisted of only 14 vessels, of which the biggest was the Ryujo of 2,530 tons and the smallest was the No. 1 Teiu of 125 tons, amounting to 12,354 tons altogether.

The second period. In 1870 and thereabout, disputes between Japan and China with regard to the reversion of the Loochoo Islands and the Japanese expedition to Formosa, which was caused by the massacre of her seamen wrecked on that island, were both settled peacefully. But the trouble between them over Korea grew more and more acute and the collision seemed inevitable sooner or later. Under these circumstances, Japan endeavoured to prepare her Navy with the object to oppose the Chinese Fleet; and while China built two big battleships, the Ting Yuen and Chen Yuen, both heavily armoured 7,430-ton ships, Japan built three big cruisers, the Itsukushima, Matsushima, and Hashidate, each of 4,278 tons, carrying one 12-inch gun. The main strength of the two navies at the beginning of the Sino-Japanese War was as follows:—

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(By courtesy of the builders, Hawthorn Leslie & Co., Ltd.)

H.M. CRUISER SUSSEX, 10,000 TONS.

(Launched at Hebburn-on-Tyne, February 22, 1928.)

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THE JAPANESE FLEET.

Ships.	Displacement. Tons.	Speed. Knots.	Guns.	
Itsukushima	4,278	16	1 32-cm.	11 12-cm.
Matsushima	,,	,,	,,	,,
Hashidate	,,	,,	,,	,,
Fuso	3,777	13	4 24-cm.	2 17-cm.
Yoshino	4,225	22½	4 6-inch	8 4·7-inch
Naniwa	3,709	18	2 26-cm.	6 15-cm.
Takachiho	3,709	18	2 26-cm.	6 15-cm.
Akitsushima	3,172	19	4 15-cm.	6 12-cm.
Chiyoda	2,439	19	10 12-cm.	—
Hiyei	2,284	13¼	2 17-cm.	6 15-cm.
Kongo	2,284	13¼	2 17-cm.	6 15-cm.
Takao	1,778	15	4 15-cm.	1 12-cm.
Yaeyama	1,609	20	3 12-cm.	—
Yamato	1,502	13	2 17-cm.	5 12-cm.
Musashi	1,502	13	2 17-cm.	5 12-cm.
Katsuragi	1,502	13	2 17-cm.	5 12-cm.
Tsukushi	1,372	16	2 10-inch	—
Tenryu	1,547	12	1 17-cm.	1 15-cm. 4 12-cm.
Kaimon	1,367	12	1 17-cm.	6 12-cm.
Tsukuba	1,978	8	8 16-cm.	M.L.

CHINESE FLEET.

Ships.	Displacement. Tons.	Speed. Knots.	Guns.	
Ting-Yuen	7,430	14·5	4 30½-cm.	2 15-cm.
Chen-Yuen	7,430	14·5	4 30½-cm.	2 15-cm.
King-Yuen	2,850	16·5	2 8¼-inch	2 6-inch
Lai-Yuen	2,850	16·5	2 8¼-inch	2 6-inch
Ping-Yuen	2,850	10·5	1 10·2-inch	2 6-inch
Hai-An	2,630	12	2 24-cm.	24 12-cm.
Foo-Ching	2,500	15	3 21-cm.	7 12-cm.
Ye-Sing	2,500	15	3 21-cm.	7 12-cm.
Kai-Chih	2,480	15	2 21-cm.	6 15-cm.
Yung-Pao	2,500	15	3 21-cm.	7 12-cm.
Tsi-Yuen	2,355	15	2 21-cm.	1 15-cm.
Chih-Yuen	2,300	18	3 21-cm.	2 15-cm.
Ching-Yuen	2,300	18	3 21-cm.	2 15-cm.
Foo-Sing	2,200	15	2 21-cm.	8 12-cm.
Nan-Schuin	2,200	15	2 21-cm.	8 12-cm.
Nan-Thin	2,200	15	2 21-cm.	8 12-cm.
Chao-Yung	1,350	16·8	2 10-inch	4 4·7-inch
Yung-Wei	1,350	16	2 10-inch	4 4·7-inch
Foo-Chow	1,300	13	2 6-inch	—
Huan-Tai	1,300	13	2 15-cm.	5 12-cm.
Kwang-Cha	1,296	13·8	2 4·7-inch	—
Kong-Bin	1,100	?	1 15-cm.	1 12-cm.
Kong-Hi	1,100	?	1 15-cm.	1 12-cm.
Kwang-King	1,030	16·5	3 12-cm.	—
Kwang-Ping	1,000	9·5	2 4·7-inch	—

(The Chinese Navy was divided into Provincial Fleets: Canton, Foo-Chow, Shang-hai, Peiho, and North Coast.)

By that time, Japanese shipbuilding made a great progress, and the Hashidate, then a capital ship, was built in one of her home

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yards. During the war many sea fights took place and each time the Japanese Fleet won the day, the foremost of which was the well-known battle of Yalu. Consequently, the control of the sea on the Far Eastern waters fell to the Japanese Navy; thus enabling the transportation of her armies to the enemy soil at will, which secured the final victory.

The third period. Japan, by the intervention of the three Powers, Russia, France, and Germany, was compelled to restore to China the Liaotung Peninsula which she bought from her with her blood in the great struggle. Russia, however, while yet the words of intervention were fresh from her mouth, leased Port Arthur and Dairen, and showed plain signs of invading the Far East. Japan, not only resentful for the forced retrocession of Liaotung, but realising that the Russian occupation of Port Arthur and Dairen would endanger the integrity of Manchuria as well as Korea, which is of vital importance to Japan's existence, began to prepare against Russian aggression. During this period, therefore, the object of her naval preparation was to oppose the Russian Pacific Fleet. The main strength of the two fleets in the Far East at the beginning of the Russo-Japanese War was as follows :—

JAPANESE FLEET.

Ship.	Displacement. Tons.	Speed. Knots.	Guns.	
Battleships—				
Mikasa	15,140	18	4 12-inch	14 6-inch
Asahi	15,200	18	4 12-inch	14 6-inch
Hatsuse	15,000	18	4 12-inch	14 6-inch
Shikishima	14,850	18	4 12-inch	14 6-inch
Fuji	12,450	18	4 12-inch	10 6-inch
Yashima	12,320	18	4 12-inch	10 6-inch
Armoured Cruisers—				
Idzumo	9,750	21	4 8-inch	14 6-inch
Iwate	9,750	21	4 8-inch	14 6-inch
Asama	9,750	22	4 8-inch	14 6-inch
Tokiwa	9,750	22	4 8-inch	14 6-inch
Yakumo	9,646	20	4 8-inch	12 6-inch
Adzuma	9,307	20	4 8-inch	12 6-inch
Cruisers—				
Chitose	4,760	23	2 8-inch	10 4·7-inch
Takasago	4,160	23	2 8-inch	10 4·7-inch
Kasagi	4,862	23	2 8-inch	10 4·7-inch
Yoshino	4,225	22·5	4 6-inch	8 4·7-inch
Naniwa	3,709	18	8 6-inch	—
Takachiho	3,709	18	8 6-inch	—
Niitaka	3,366	20	6 6-inch	—
Akashi	2,756	20	2 6-inch	6 4·7-inch
Suma	2,657	20	2 6-inch	6 4·7-inch
Akitsushima	3,172	19	4 6-inch	6 4·7-inch
Idzumi	2,950	17	2 6-inch	6 4·7-inch
Chiyoda	2,450	19	10 4·7-inch	—
Itsukushima	4,278	16	1 32-cm.	11 4·7-inch
Matsushima	4,278	16	1 32-cm.	11 4·7-inch
Hashidate	4,278	16	1 32-cm.	11 4·7-inch

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Ships added to the Fleet after the outbreak of war.

Ship.	Displacement. Tons.	Speed. Knots.	Guns.	
Armoured Cruisers—				
Kasuga	7,628	20	1 10-inch	2 8-inch 14 6-inch
Nisshin	7,628	20	4 8-inch	14 6-inch
Cruisers—				
Tsushima	3,366	20	6 6-inch	—
Otowa	3,000	21	2 6-inch	6 4·7-inch

RUSSIAN FLEET.

Ship.	Displacement. Tons.	Speed. Knots.	Guns.	
Battleships—				
Petropavlovsk . .	13,541	16·9	4 12-inch	12 6-inch
Tsesarevitch . . .	12,900	18	4 12-inch	12 6-inch
Retvizan	12,900	18·8	4 12-inch	12 6-inch
Sevastopol . . .	11,840	17	4 12-inch	12 6-inch
Peresvyet	12,670	18·6	4 10-inch	10 6-inch
Pobyeda	12,700	18·5	4 10-inch	10 6-inch
Poltava	10,960	163	4 12-inch	12 6-inch
Armoured Cruisers—				
Rossiya	13 670	19·7	4 8-inch	14 6-inch
Gromoboi	13,220	20	4 8-inch	16 6-inch
Rurik	11,690	18·8	4-8-inch	16 6-1nch
Heavy Cruisers—				
Bayan	7,720	21	2 8-inch	8 6-inch
Bogatuir	6,640	23	12 6-inch	—
Diana	6,600	19	8 6-inch	—
Pallada	6,820	19·3	8 6-inch	—
Varyag	6,500	23	12 6-inch	—
Askold	5,900	23	12 6-inch	—
Light Cruisers—				
Boyarin	3,200	22	6 6-inch	—
Novik	3,080	25	8 6-inch	—

All the battleships and the majority of the armoured cruisers with which Japan prepared herself during this period were built in England. In the meantime Japanese shipbuilding made such a rapid progress that she could lay down up to 18,750-ton armoured cruisers, the Tsukuba and Ikoma, at her home yards in the spring of 1905.

The strategy of the Japanese Navy in the Russo-Japanese War was to destroy first the Russian Pacific Fleet before it had been joined by that from the Baltic. With this end in view, she decided to deliver a hard blow on the Russian Pacific Fleet at the outbreak of hostilities and thereby to secure the control of the Yellow Sea, enabling the transportation of her army to Manchuria, and then, if she could capture the enemy's base at Port Arthur with the co-operation of the army, the Russian Pacific Fleet would be entirely in her power. This plan was accomplished as foreseen, and at last

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the Battle of Tsushima (the Japan Sea) saw the total destruction of the Baltic Fleet. In this way the sea power of the Far East fell again into Japanese hands.

The fourth period. After the war, Japan and Russia, giving up their enmity, entered into friendly relations with each other. The Anglo-Japanese Alliance warranted the British interest in the Orient on the one hand, and secured, on the other, the international position of Japan, who could devote herself to cultivate her newly gained ground in South Manchuria and Korea. Thus Japan, having no particular naval rival after the war, set up a moderate shipbuilding programme solely for safeguarding her own land, according to her own idea, and worked upon it until the Washington Conference.

The progress of her actual shipbuilding during this period was as follows :—

Year.	Building Programme.	Note
1905 and 1906	*Ships under construction in Japan*— Armoured Cruisers. Tsukuba, Ikoma } 13,750 tons, 4 12-inch. Kurama, Ibuki } 14,600 tons, 4 12-inch, 8 8-inch. Battleships. Satsuma, Aki } 19,000 tons, 4 12-inch, 12 10-inch. Cruiser. Tone { 4,000 tons, 2 6-inch, 12 4·7-inch. *In England*— Battleships. Katori, Kashima } 16,400 tons, 4 12-inch, 4 10-inch.	From the strength of the Japanese Navy at the beginning of the Russo-Japanese War must be deducted two battleships, the Hatsuse and Yashima, and two cruisers, the Yoshino and Takasago, which were sunk during the war. In addition to these, the explosion of the Mikasa temporarily reduced a further battleship unit, but she acquired the majority of the ex-Russian Pacific Fleet and the surrendered ships at the Battle of the Japan Sea.
1907	*Already fixed Programme*— Battle Cruisers. Hiyei { 27,500 tons, 8 14-inch. Destroyer. Yamakaze (first big destroyer of 1,200 tons). *New Programme*— Battleships. Kawachi, Settu } 20,800 tons, 12 12-inch. Cruisers. Chikuma, Yahagi, Hirato } 5,000 tons, 6 6-inch, 8 4·7 inch.	Adjusting the War Programme, and to conform with the general tendency on shipbuilding since the advent of the Dreadnought, she started a New Programme. All the ships under the New Programme and later programmes were laid down in Japan except the battle cruiser Kongo.
1910		She settled the policy to make the 8, 8 Fleet [Fleet consisting of 8 Battleships and 8 Battle Cruisers] the main body of her defensive fleet entirely from the standpoint of self-defence.

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Year.	Building Programme.	Note.
1911	*New Programme—* Battleship. Fuso { 30,600 tons, 12 14-inch. Battle Cruisers Haruna } 27,500 tons, Kirishima } 8 14-inch.	Stimulated by the naval rivalry between England and Germany, she set up a New Shipbuilding Programme of super-dreadnoughts.
1913	*New Programme—* Battleships. Yamashiro { 31,00 tons, 12 14-inch. Ise } 31,260 tons, Hyuga } 12 14-inch.	
1914	Destroyers. 10 Kaba class, 700 tons.	Up to this time, she laid down mainly the capital ships, somewhat neglecting destroyer building, but the outbreak of the European War necessitated the building of destroyers in haste. These were sent to the Mediterranean during the War.
1915	*New Programme—* Destroyers. 4 Hamakaze class (larger type). 4 Momo class (intermediate type). 2 Submarines.	
1916	*New Programme—* Battleship. Nagato { 33,800 tons, 8 16-inch. Light Cruisers. Tenryu } 3,500 tons, Tatsuta { 4 5·5-inch. Destroyers. Tanikaze (larger type). 3 Submarines.	
1917	*New Programme.* Battleships. Mutsu (Kaga) { 33,800 tons, 8 16-inch. Battle Cruisers. (Amagi), (Akagi). Light Cruisers. Kuma, Tama, Kiso, Kitakami, Oi, Nagara, Isuzu, Natori. } 5,500 tons, 7 5·5-inch. Yubari { 3,100 tons, 6 5·5-inch. Destroyers. 9 Larger type 18 Intermediate type. Submarines.	In 1916, that is, the year after the decision of the Three-Year Programme made by U.S.A., Japan set up an 8, 4 Fleet Programme, as a step to reach an 8, 8 Fleet. The Kaga and Akagi were later reconstructed as aeroplane carriers, and the Amagi was scrapped as a result of the Washington Conference.

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Year.	Building Programme.	Note.
1918	*New Programme*— Battle Cruisers. (Atago), (Takao). Light Cruisers. Yura, Kinu, Abukuma } 5,570 tons, 7 5·5 inch. 20 Destroyers. Submarine, etc.	8, 6 Fleet Programme was set up.
1920	*New Programme*— Battleships. (Kii), (Owari), (No. 10), (No. 11). Light Cruisers. Sendai, Jintsu, Naka } 5,570 tons, 7 5·5-inch. 2 Destroyers. Submarines, etc.	8, 8 Fleet Programme was set up. [A Fleet consisting of 8 battleships and 8 battle cruisers.]
1923	10,000-ton Cruisers. Myoko, Nachi, Ashigara, Haguro. 7,000-ton Cruisers. Kako, Furutaka, Aoba, Kinukasa. 21 Destroyers. Submarines, etc.	As the result of the Washington Conference, the building of all capital ships was stopped; the already fixed programme for auxiliaries was worked on, modified and cut down.
1924		In consequence of the Great Earthquake, the established programme was postponed a year, with a view to curtail expenditure.
1926	4 Destroyers.	This programme was set up to replace the old boats.
1927	10,000-ton Cruisers. Takao, Atago, Maya, Chokai. 15 Destroyers. 4 Submarines.	This programme was set up to replace the old vessels, and is to be finished by 1936.

What Japan Needs.

The above is the outline of historical development of the Japanese Navy up to the present day. Historical facts themselves are quite beyond discussion, but circumstances that lead up to them are worth studying, since we often find there deep-rooted needs of a nation struggling for its existence. And will not this study, which makes us understand real motives of national policies, help a great deal to promote the peace of the world? While it is true that a country cannot push through her policy regardless of others in international society, it is sometimes even more dangerous to peace when a nation, wholly ignorant and suspicious of the case, tries to settle another's question in an arbitrary fashion. The historical survey above will reveal some fundamental points in regard to what Japan expects from her Navy.

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Even in the ancient days when national consciousness was still weak, Japan was so vitally related to Korea and its neighbouring continent and islands that grave situations there affected her own life and death, and she often staked her fate for self-defence. With the development of science, which is lessening distance in various ways, this sphere of her vital concern must naturally be widened, and it is obvious that Japan cannot hope to live without keeping close economical relations with the Asiatic Continent at least, in view of her superabundant population and industrialised national life. With regard to these matters, however, I shall not repeat what Commander Sato, I.J.N., has already dealt with in the 1927 issue of the "Naval Annual." In the past Japan challenged those Powers that immediately menaced her existence on these vital conditions, as China at one time and Russia at another. It is the same principle that has driven Great Britain instinctively to war against the countries which threatened the Suez Canal, one of her imperial arteries, or India, as well as her homeland. By the same reason, also, the United States could not keep silent when the Caribbean Sea or the Panama Canal, so delicate to her interest, were disturbed by others.

After the Russo-Japanese War, there is nothing in the Far East to threaten Japan directly on these points. Consequently, Japan is not preparing her Navy to oppose any particular Power, but only to complete her self-defence in guarding the seas around her, and keeping safe communications with the Asiatic Continent. That Japan is in no position to create menace to other Sea Powers is shown by the fact that she accepted the 5 : 5 : 3 ratio in capital ships at the Washington Conference, and also that she has no outlying naval bases to operate her navy from near other countries. And this defensive navy of Japan, as explained at the Washington and Geneva Naval Parleys, is the minimum determined by her traditional convictions and strategetic studies. If this purpose is recognised, Japan is ready to limit her armament in co-operation with other Powers. This is why she did her part so wholeheartedly at conferences in the past, and she will continue to do so in the future.

The Problem of Limiting Naval Armament.

The arguments of the Powers on limitation of naval armament were pronounced in diverse ways according to their particular situations, but all of them insist on one important point, and that is a guarantee of national security. In consequence, the question is how to settle the quantity and ratio of armaments of each country without endangering her national safety. This question might be considered in the following three categories :—

(1) Quantitative parity.
(2) Defensive parity, but quantitative imparity.
(3) Quantitative and defensive imparity.

Since conditions of every country are different, the quantitative parity does not always mean equal defensive power. But as every country has the right of self-preservation, it is a matter of course

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that each should enjoy parity of defensive power. And in order to secure this kind of parity, it would be necessary to set down an impartial ratio of armaments for respective countries, considering their national needs. Japan, of course, would not insist upon quantitative parity, though she may have the right to do so, but she does insist on an adequate allotment of ratio in armament to make her defensive power equal to any nation.

What, then, would be this ratio? As far as capital ships are concerned, Japan conceded to the 5 : 5 : 3 ratio in the spirit of conciliation, and also in view of enhanced security by agreement on the *status quo* of fortifications and naval bases in the Pacific region, at the Washington Conference; but it is not necessarily extended to the ships of other classes which have more defensive character than offensive. After deliberate studies in strategy, taking all things possible into consideration, I am fully convinced, as frankly voiced by the Japanese delegates at Washington and elsewhere, that at least 70 per cent. in naval armament, as compared with that of the strongest Power in the world, is of vital necessity to maintain her national security.

M. NIIMI,
Commander, I.J.N.

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CHAPTER V.

Naval Policy of the United States.

Immediately after the conclusion of the Washington Conference in 1921–22 the Navy Department formulated a naval policy, in accordance with the agreements then reached, which was approved by the Secretary of the Navy at the end of 1922, and has since been published as a Congressional document. We must refer to this naval policy sheet as a basis for discussion of American naval development. As the fundamental naval policy of the United States it lays down that: "*The Navy of the United States should be maintained in sufficient strength to support its policies and its commerce and to guard its continental and overseas possessions.*"

With regard to the Treaty of Washington, it says: "*Until such time as other Powers by inequitable conduct in international relations as to United States' interests, or by their departure from the idea of a suspended competition in naval armaments, indicate other procedure, the Navy of the United States may be governed in naval strengths by the spirit of the capital ship ratios, otherwise it will be necessary appropriately to readjust our naval policy.*" The general naval policy is "*to create, maintain, and operate a navy second to none, and in conformity with the ratios for capital ships established by the Treaty for Limitation of Naval Armament,*" "*to support in every possible way American interests, especially the expansion and development of American foreign commerce*" and "*American merchant marine.*" After a reference to the importance of battle-strength as a primary necessity, it goes on, "*To make strengths of the Navy for exercising ocean-wide economic pressure next in importance.*" Most of the remainder of the 2,500 words of the policy sheet treats of details.

Here are three purposes of the Navy, to accomplish which the Navy Department must maintain an adequate force in ships and men: namely, to support American policies, support American commerce, and (after providing battle-strength) exercise economic pressure against persons and property during war as an effective means of supporting American policy. The Admiralty Staff of any other naval Power would doubtless avow the same general purposes for its Navy. The point of international interest lies in ascertaining the special policies of the United States, and in determining where they are in conflict with those of other Powers. Like other nations, the American Government makes no general announcement of policy. As each occasion develops, the administration acts according to the situation of the moment. Consequently, on each occasion it is free to do as it seems best for the moment and for the future.

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Nevertheless, if we look at past history the inclinations and prepossessions of the people may be perceived to have been enduring, and it is to be assumed that they will continue. These popular aspirations form national policy.

Let us note how the people have behaved at critical times. The first formative period in American foreign policy was in colonial days and led to the Revolution. The British Government maintained the mother country in a position of privilege with regard to the colonies. American timber was marked with the broad arrow for the Royal Navy, and ships carrying cargoes from one colony to another, from Virginia to Massachusetts, were obliged to pay import duties to England before delivering the goods to the buyers. The colonies felt they owned the timber on their own lands, and the customs duties were a burden. They resented their subjection to English privilege and declared their independence, on the ground that "all men are created free and equal," meaning thereby not so much that men were physically equal as that the colonies were entitled to equality of opportunity and of treatment as against the claim of British privilege. This is the first item in American foreign policy: namely, the "open door" in foreign trade, or equality of commercial opportunity in opposition to the general practice of national reservation of commercial privilege on every practicable occasion. The United States has not since failed to follow this doctrine. No sooner had the Spanish war turned this country from absorption in internal development to contemplate herself with some surprise as a World Power, than the Boxer Rebellion gave her an occasion to insist on the "open door" in China, where European Great Powers and Japan were contemplating the partition of China and reservation of her trade by spheres of influence. The brilliant diplomacy of John Hay, Secretary of State, secured the adhesion of the Powers to his policy, and it was strengthened by the political treaties at the Washington Conference in 1921–22. We may take it that the policy of the "open door" for American trade against foreign "spheres of influence" is an established point in American foreign policy. The second step arose out of the wars of the French Revolution and Empire. The belligerents interfered with the freedom of neutral trade, and in addition Great Britain impressed American seamen from American ships, besides extending her possessions in South America. The result was that the United States declared war against Great Britain to the the cry of "Free Trade and Sailors' Rights." As before, the United States was aggrieved by difficulties thrown in the way of her trade, but in addition she went to war in defence of the rights of her seamen when beyond the jurisdiction of the nation. This duty is a growing one. The protection of citizens beyond territorial limits involves a recent and developing point in international law, which we see now exemplified in Chinese affairs. The tenets of international law have been evolved from the doctrine of the sovereignty and independence of states. Originally the economic bonds between states were slight and did not greatly influence their political independence. But the remarkable improvements in transportation of the last

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century have made the world an economic unit. Every nation is more or less interested in the good order of every other one, because of business relations; and economics is the basis of all international politics and, it may even be said, of international law. Such being the case, the men who go abroad for business are a part of the industrial organisation of their respective countries, and as such are entitled to national protection when their conventional rights and liberties are infringed.

This is the second point in American foreign policy—the protection of American persons and property abroad. The third point in the development of American policy came when our sympathy was aroused by the mother country's oppression of the Spanish-American colonies and their consequent successful rebellion about 1820. When it seemed likely that an attempt might be made to re-establish Spanish authority, the Monroe Doctrine declared that this country could not consent to renewal of European sovereignty over the recently liberated colonies of Spain. Again this country had extended its international policy, without formal agreement with other nations. Monroe's declaration completed the trilogy of American policies governing international relations: namely, the open door in commerce, protection to Americans engaged in lawful business beyond the territory of the United States, and the discouragement of political oppression of other peoples as far as our influence reaches. We still abide by those three policies and are not willing to lay them aside. They are essentially trade policies. The people believe that by them they are promoting the welfare of the country at large.

Therefore, let us now examine the economic development of the United States, its present status in international business, and our maintenance of the "open door." In colonial times and until well into the nineteenth century the industries of the country were chiefly agricultural and maritime. By 1830 the commerce and shipping of the United States were second only to those of Great Britain and continued so until 1860. Until then the United States was a great maritime Power, doing its own carriage of its own goods. But the growth of railways after 1830 began the opening of the West on a great scale and altered the whole economic policy of the country. The Civil War put an end to the overseas shipping of the nation, although the coastal and lake shipping continued to grow. While building the railways and occupying the wilderness of the frontier the country remained agricultural and became a debtor nation, chiefly to England. Since the exports of the United States were mostly agricultural, they did not compete in the markets of the world with the manufactured exports of Great Britain, and the latter country replaced American shipping in the traffic of the world to the advantage of both nations. But by 1900 the internal situation had changed again. The West had been occupied, and the railway system was complete. There had been great urban growth, accompanied by a great increase of manufactured goods, and the country was beginning to export manufactures. From a business client of Great Britain, the United States was becoming a manufacturing

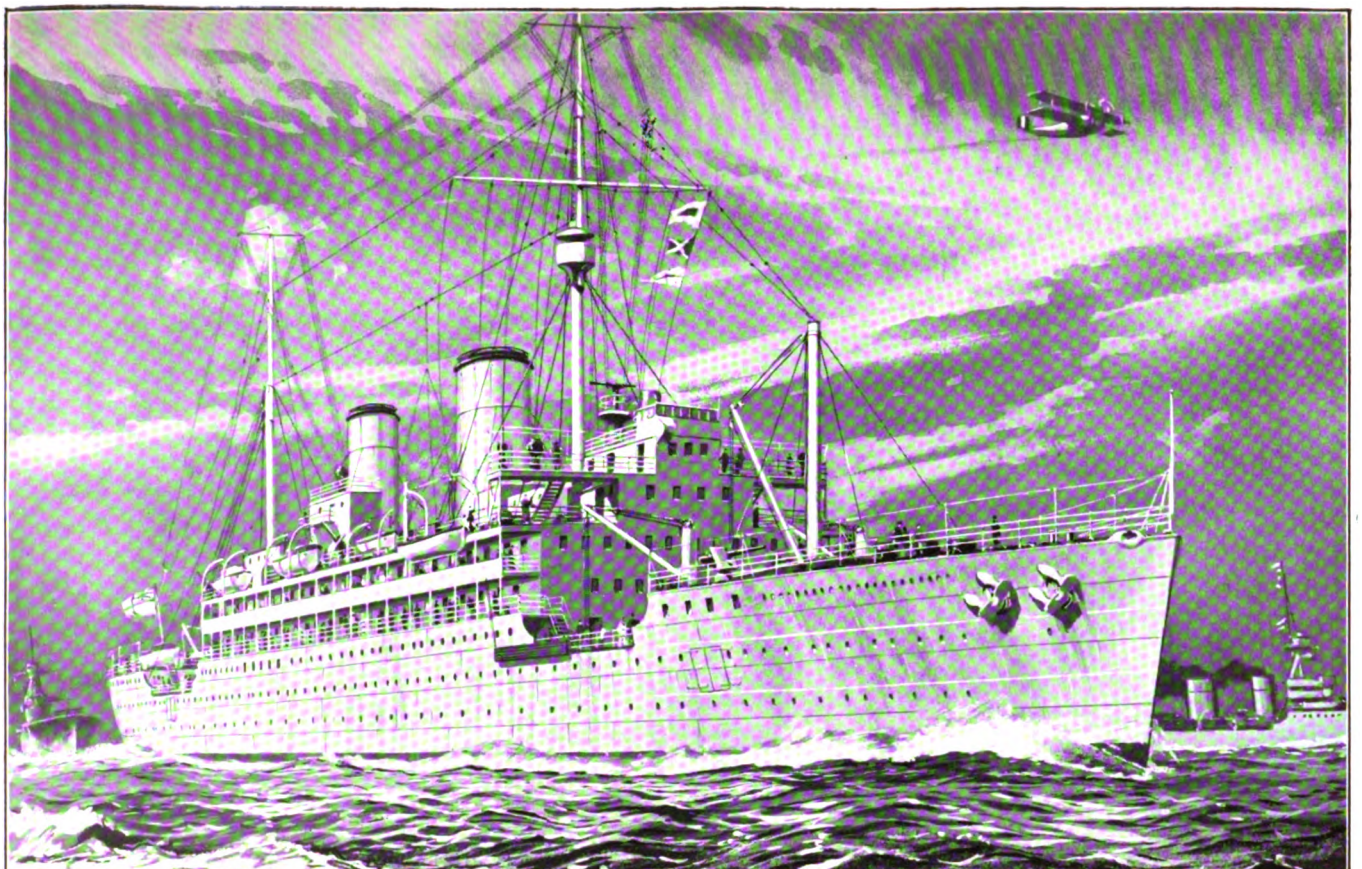
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rival. The close of the Great War found the economic transformation of the country accomplished. From a debtor nation she had become a creditor of the world. Although still a great agricultural country, her manufactures led the world, and nearly 10 per cent. of all her products were sent abroad. The necessities of the War had called her to build a great merchant fleet. From this time it has no longer been economically wise to rely on foreign shipping to transport American goods. In the world markets the other great manufacturing nations are competitors of the United States, which exceeds them in wealth and products. It is impossible for this country longer to permit her rivals to carry her goods and expect them to exercise no discrimination in favour of their own business. Our own Shipping Board runs at a loss, but nevertheless it is worth the cost to control rates, which experience has shown would otherwise be used as a handicap against our commerce. As it is the British-made insurance rates are against American shipping, for we have no national system of maritime insurance sufficiently large to take all our business. The recent Act of Congress brought some modification in the matter of discrimination within a few weeks after passage.

Thus the present economic situation of the United States is that she has a great quantity of raw materials and manufactured goods which must find foreign markets, and each year it is becoming increasingly apparent that she must carry a large portion of her foreign business in her own ships. Except for Canada on the north and Mexico on the south, the country can gain access to the world only by sea. The United States has practically an insular position between the two great oceans, and needs a great merchant fleet for the reasons that every Englishman understands so well. And she needs a Navy to protect that merchant fleet.

It can be safely said that the policy of this country is pacific and defensive, and there is no aggressive purpose in the minds of the people towards any other nation. During the nineteenth century the country was occupied with its own internal development, and consequently the public has little tradition as to foreign policy such as all European countries have. The change in the position of this country brought about by the Great War is just beginning to become evident to the general public. We are the richest nation, with huge investments across the oceans, and must have the means of protecting them. But since we are not entangled in the rivalries of Europe in case of war, in all probability it is as neutrals that our trade must be defended. We remember that when the Great War broke out, although we were neutral, nevertheless our business was paralysed; for we had no national shipping. The warring Powers used their ships for their own military purposes, or laid them up in port as the Germans did, and thereby our imports were checked, our factories lacked material, and the docks were congested with goods which could not be shipped abroad. This distress has not been forgotten. We recollect, too, that the Allies, including this country after she entered the War, did not hesitate to seize the shipping of weak neutrals and employ it for belligerent purposes. It was made

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H.M. SUBMARINE DEPOT-SHIP MEDWAY.

(Fitted with Vickers-M.A.N. Internal Combustion Engines.)

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clear by that experience that this country, if she is to retain some mastery over her fate when neutral in a great war, must possess a merchant fleet proportionate to her overseas commerce and protect it by an equally strong navy.

It is idle to rely upon the protection of international law, or upon peace-time agreements covering the freedom of neutral trade in war. Lawyers like to talk of the sanctity of law and many publicists seem to believe international agreements may be trusted to endure under strain. But international law is true law only so far as nations apply it to control the behaviour of their respective nationals. Between the sovereign states themselves international law is merely a matter of custom or contract which can be enforced only by war or the threat of war. The Navy of the United States is the means which will give weight to her views as to the proper treatment of neutral commerce in war. No bare treaty or international convention will protect commerce in war. There always have been two ways of making war, by the attack on life and the attack on property. The attack on life is more speedy in its result, but the other is equally certain if sufficiently severe. No nation at war will renounce the right to attack property unless it must. The United States tried to have the Declaration of Paris in 1856 amended to cover neutral goods, and tried again at the Second Hague Conference in 1907, but unsuccessfully both times.

Hitherto we have considered the situation of the United States only, but the basic relations of states are economic and depend on their economic competition in the markets of the world, and we must now glance at the situation and policies of other maritime nations as they seem to us in America.

Japan has long desired supremacy in Asia. During the War she seemed to think of securing supremacy by the German method, but the result of the War put that method into disfavour, and since then she seems to favour economic penetration on the continent. If she ever had longings for the Philippines and the Dutch East Indies, as often alleged, they are now laid aside. She is pushing the conversion of her industries from a manual to a machine basis, but has not gone as far as Europe and America and is still poor. She cannot make serious offensive warfare without foreign backing. On the other hand, the Treaty of Washington, which forbids further growth of fortifications between Singapore and Hawaii, increases her military and naval weight in all Eastern Asia. The Four-Power Treaty of Washington relating to the *status quo* of China does not guarantee that country from seizure, but the formal declaration of the Japanese Government that the present occupation (1928) of Shantung is temporary only is reassuring as to that province. As to the naval forces of Japan, her action at Geneva last summer (1927) indicates that she does not regard a 5–3 ratio of naval strength as giving her a desirable measure of military security in the waters about her neighbourhood, but if she can improve the ratio of the Washington Conference, financial reasons make her willing to reduce her naval forces by agreement with England and the United States.

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Now for the English position as it appears to America. During the nineteenth century Great Britain led the world in the production of coal, iron, and manufactures, and in shipping. About 1900 both the United States and Germany began to pass England in the first three lines. The close of the War found the United States far ahead of England in coal, iron, and manufactures, and with a great merchant fleet under construction. England could retain a great portion of her old-time supremacy only by keeping control of ocean transportation, by sea-power, and by making herself the international middleman in all the world's markets, taking the middleman's usual large profits on his mercantile transactions. Germany's sea-power had been destroyed by the War: the only immediate obstacle to this plan was the growing American maritime strength. The British declarations made in 1919 as to economy and reduced navies met with no reply from America, for Mr. Wilson still hoped to put the United States in the League of Nations, and it has even been asserted that he desired a strong army and navy in order that the United States might be able to enforce the decisions of the League. Nevertheless, the English desire for economy affected American public opinion. So when the First Lord of the Admiralty announced at the autumn session of Parliament in 1920 that he hoped the United States would summon a conference for the reduction of armaments, his suggestion met with an excellent reception in America, where it was believed very widely that the recent war had put an end to war and that large armaments might well be dispensed with.

When the new Republican administration came to office in 1921 an international conference for the reduction of armaments seemed to offer an opportunity to accomplish a chief object of the League of Nations without actually joining it. After some informal negotiation in London in the summer of 1921, it was agreed that if satisfactory political arrangements could be made (referring to the Anglo-Japanese Alliance, the Chinese situation, and the Islands of the Pacific), it might then be possible to reduce armaments. Accordingly the call was issued from Washington. It was clear to all in America that Great Britain wanted to build as little as possible and that the American fleet then under construction of sixteen of the largest ships in existence was distasteful to her.

At the opening of the Conference the address of the American Chairman proposed to accept the *status quo* of the British battleship fleet and sacrifice the new American ships which threatened British superiority. The British Delegation hastened to accept this generous offer, but refused to limit cruisers. That is to say, from our point of view, the British were willing to accept our sacrifice, but refused to make any of their own. The intention of the Admiralty to scrap several older battleships had already been made known. As to cruisers, although he declined in practice, Mr. Balfour was thought at the time by all Americans to have agreed in principle to equality. But last year (1927) during the Geneva Conference, Americans were astonished to learn from Lord Balfour that at the Conference in 1921 he had not agreed in

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principle to equality of cruiser strength, and that the purport of his declaration on this subject had been misunderstood in this country. But the explanation of his somewhat vague remark in 1921 came too late to affect American public opinion, which has accepted the idea that its Government is not to agree to make its Navy second to any other. As Mr. Hughes had laid all his cards on the table at his opening address he was obliged to accept the Japanese requirement that there should be no increase in the strength of American naval bases west of Hawaii. The result of the Washington Conference was that Great Britain and Japan profited by the feeling in the United States that wars were unlikely in the future, and they obtained a naval agreement that was satisfactory to them.

On the other hand, in the political treaties that were the outcome of the same conference, some compensation was given to the United States for its naval limitation. Mr. Hay's policy of the "open door" in China was confirmed, but without much emphasis, and the Anglo-Japanese alliance was terminated, but it has since become known that in the previous summer (1921), at the meeting of Colonial Premiers in London, Canada had refused to consent to the renewal of this alliance. On the whole, America yielded in 1921 to Great Britain's desire because in the reaction from the War public opinion assumed for the moment that armaments were the cause of wars and did not perceive that for a country like the United States, which wishes no spheres of exclusive commercial privilege, which refused all mandates at Versailles, and which as its national policy in its relations with all other countries asks only for equal trade opportunity with other foreign business—for such a country armaments are defensive only, but indispensable if trade is not to be unduly depressed when other nations go to war. Whenever the next great war may come, this country hopes to be neutral, and in that case the only sanction for the neutrality of its commerce will be the dread of American hostility and the size of the American Navy. We are now so important economically, that with our growing sea-power belligerents will be ready to make those concessions to our neutral trade which in times past they refused to our weakness.

After the Washington Conference it seemed to American observers that although the United States had sacrificed her superiority in capital ships, Great Britain had no intention of limiting herself in the smaller classes which were cheaper to build and maintain. However, the League summoned a conference in 1926 to discuss general reductions of armaments, ashore and afloat; the United States accepted an invitation to attend it. Of course, the United States has so small an army that there could be no thought of reducing that, but the American Administration was hopeful of reaching some accord on naval armament. The long discussion at Geneva proved fruitless. but all participants learned much of the stand of other nations. The possibility appeared that perhaps some agreement might be reached on cruiser limitations by the three chief naval Powers.

There was considerable interchange of views between the American Navy Department and the British Admiralty during the

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next few months. Mr. Coolidge called a conference to meet at Geneva in June 1927. The British Admiralty was fully informed as to the American wishes, and the British wish to propose changes in the terms of the Washington Conference was equally well known on this side. When the Conference met, the divergence of views was more marked than the Americans had expected in view of the previous informal discussions. The Americans hoped to accomplish the unaccepted part of their 1921 proposal regarding cruiser strength, but the British proposed to modify the Treaty of Washington, although they already knew this would be unacceptable to the American Government.

The Conference then went into committee work. The United States insisted on maintaining the right to build all the 10,000-tons 8-inch cruisers that it wished within the limit of total tonnage to be accepted, whereas the British wished to place a limit on the big cruisers as a class and, in addition to them, build a number of smaller cruisers with only 6-inch guns. The total tonnage the British asked for was far beyond what America wished to accept, and the Conference failed to reach an agreement. As Mr. Gibson, the head of the American Delegation, said, to agree to such a large figure would not be limitation. The American Delegation held that in view of the vast amount of foreign commerce of this country, it could not by treaty accept anything less than complete parity with the British Fleet, and did not wish to build to the figures the Admiralty proposed, and it wished the liberty to put all its cruiser tonnage in 10,000-ton units. On the other hand, it seemed to the Americans that the British proposal did not really concede complete parity, and that they intended to preserve a superiority in cruiser strength. There has been some discussion in the Press since the Conference, as to why it failed, and it has been stated that the two Powers should have reached an informal understanding before the call was issued. As for that, disarmament had been discussed for a full year, both at Geneva and in London. It was fully understood in Washington that Great Britain did not wish to build her entire cruiser fleet in 10,000-ton units, and it was known in London that any change in the Washington Treaty would be unacceptable on this side.

If it is asked why Mr. Coolidge issued his call before knowing there was a probability of success, it may be said that the informal discussions had not indicated to Washington that Great Britain would insist on such a large total tonnage, nor that she would expect the United States to be limited to only a few of the large cruisers which alone suit her lack of strategic bases outside the continental United States. At Washington it was thought that agreement was an affair of arranging details as to categories of cruisers. The British delegate, Mr. Bridgeman, announced at the first meeting that it had been the intention of the Government to call a conference at an early date, and that Mr. Coolidge had forestalled the British by only a short space of time. So both governments thought agreement possible. An explanation has been offered in the United States as to the readiness of Great Britain to attend a conference, to the effect that it was realised in London that the American

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Delegates would not find the British proposals acceptable, but nevertheless the British Cabinet made them because it believed that public opinion in America would be so strong in favour of the British proposals that the American Administration would feel it necessary to yield its own views and accept a treaty. This explanation is in some degree confirmed by Lord Cecil's statement since the Conference that he and Mr. Bridgeman, against their own opinion, were directed by the Cabinet to maintain the British decision intact to the close of the Conference. We may take a paragraph to speculate on future developments. The recent informal and personal statements of British officials (which could not be made without Government approval) show that since the Conference last year the British Government has no further concessions to offer for the sake of a naval treaty with this country.

On the other hand, if one may judge from the British Press, it seems that public opinion in Great Britain is beginning to understand that the trade of the United States is as far flung and as extensive as its own, with the disadvantage of less widely spread national ports and bases for the support and protection of trade in peace and war. Consequently, the British Press begins to perceive that the United States cannot afford to agree to anything less than full parity with the British Fleet, and further perceives that the size of the United States Fleet is the sanction for the freedom of the seas for American neutral trade, which America tried in vain to secure in the Declaration of Paris of 1856 and at the Second Hague Conference in 1907.

In consequence of this British perception of American attitude as to sea-power, Lord Rothermere proposes in the Press that the United States and Great Britain should jointly maintain the freedom of neutral trade in war. In practice this might turn out to mean that when Great Britain is at war the United States would be pledged to guarantee neutral trade with her. As another form of recognition of America's sea-power the Press makes it apparent that British public opinion is discussing making some agreement with the United States as to limitation of naval armaments on a basis of parity of the two fleets which shall be accompanied by a political arrangement whereby the United States will recognise League action against an "aggressor" state, and permit England as the proctor of the League to apply the rigour of blockade as in 1917–18 against the recalcitrant state, without regard to American trade. As Great Britain did not see her way to concede naval parity to the United States at Geneva in 1927, the British suggestion now more or less in the air for ventilation is that in return for a formal concession of naval parity the United States will acknowledge the political leadership of Great Britain and permit her to take such maritime action as the League of Nations approves and she desires. For the United States this course has little to commend it. The United States has not joined the League and gives no indication of doing so. It seems improbable that she would consent to be guided by the dictum of the League without having any voice in its decisions. The League does much international social and welfare work in

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which the United States has gladly joined; but the great political questions which threaten the peace of nations which so far have risen before the League of Nations have been matters of European origin in which the United States has not been primarily concerned. In regard to these matters, the League is practically controlled by its three or four leading members, having great machine industries at their disposal, as well as ocean shipping and military strength. This control is effective because, although political divisions continue, the world is becoming more and more an economic unit, in which the smaller Powers are establishing a standard of living and habits of life depending on modern machinery controlled by the Great Powers. Therefore, if the Council of the League can agree and the Great Powers take joint action the "aggressor" state cannot resist effectively and will yield before it is hurt. Thus the question will not arise whether the United States will or will not support League action.

If, however, the Great Powers, members of the League, cannot agree among themselves as to measures against the recalcitrant state, there will be no League action, and the United States will reserve her full freedom of action to pursue the course which best suits her interest in the dispute as she has done in the past.

Many people believe that if nations are heavily armed they will necessarily be inclined to war, and that peace is more likely to be preserved if armaments are slight. For the United States the reasoning is not applicable. She has entered all her wars unprepared, and as Sir Austen Chamberlain recently said of Great Britain, war has never been an instrument of American national policy.

The War threw the United States into world politics, and the nation is realising that it is too important in the world financially and economically to trust unarmed to the forbearance and good-will of other countries. For the country voluntarily to limit its defensive strength and pledge itself to any definite line of behaviour as a neutral in the next war would be most short-sighted, unless, indeed, some immediate political and economic advantage could be secured by such a concession. The United States is wholly peaceable, but if it is asked to agree to limit its defences it must be offered some effective pledge of security or other compensating advantage. As was mentioned earlier in this article, the continuous foreign policy of the United States has been for equality of business opportunity in opposition to the general policy of the Great Powers for special commercial privilege in third countries as against their commercial rivals. It has not yet been proposed that general acceptance of this policy might be made a basis for reduction of naval armaments. The ocean commerce of the United States is so great that it requires a proportionate navy to protect it, and this the country is well able to afford. It has not been made apparent that the nation would gain in other directions by agreeing to sacrifice her ability to give her foreign trade the full measure of security which its importance demands. Opinion in the United States is not at present averse to some agreed limitation of naval armaments. When we sacrificed

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our new battleships in 1922 we relied on the Parliamentary statement of the First Lord, of March 12, 1921, that Great Britain thenceforward accepted a One-Power Standard of naval strength. There is no probability that we will formally accept a position second to that of any other Power.

W. L. RODGERS,
Rear-Admiral U.S. Navy.

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CHAPTER VI.

The Geneva Conference and After.

The war left the world sick of war, and in the decade that has passed since the Armistice much thought has been focussed on the problems of peace and war, and a great deal of wealth and energy has been devoted to schemes for the prevention of war. Armaments are naturally closely associated with the question and in discussing them many people are inclined to think of war solely in terms of weapons of war—*e.g.* battleships, aeroplanes, tanks and submarines, and to imagine that disarmament will bring universal peace. This is a delusion, for armaments in themselves are only an expression of the spirit behind them, and mere mechanical disarmament cannot exorcise the spirit of strife.

The problem is not one of materials and technical terms alone, but of international justice, friendliness and goodwill.

In the decade that has passed since the war very contrary opinions have arisen as to the best method of assuring peace. There is one school * that regards the Treaty of Versailles as a source of inevitable war and calls on the world to modify the harsh decrees of 1919.

It is a school, however, which finds no support in France, where the Quai d'Orsay pins its faith to the magic word "security," and seeks to consolidate and crystallise the present state of Europe through the League of Nations by making naval and military action obligatory on all members of the League, and by pooling, so to speak, the security of the world in a great collective pact—in terms of Versailles.

The Protocol of 1924 is a product of this school of thought. It is enough to say that it would have committed us to naval and military action against the United States if the States who do not belong to the League refused to submit to its conditions.†

The Protocol and the great collective pact having gone by the board, great things have been spoken of "regional pacts" which are nothing more or less than treaties by which nations guarantee one another against aggression. The Treaty of Locarno,‡ however, was something more than this.

In it Great Britain guaranteed the Franco-German frontier against aggression by either assailant. It represents no doubt "an

* See Philip Kerr, *Observer*, September 23 and 30, 1928.

† Under Article XVI. of the Protocol. For Protocol see League of Nations, Fifth Assembly, November 2, 1924, in British Cd. 2273 of 1924. For reasons against it see Rt. Hon. Sir Austen Chamberlain, House of Commons Debates, November 24, 1927.

‡ October 16, 1925.

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immense contribution to the security of Europe," * but remains ominously reminiscent of the entanglement which led us into the enormous military commitments of 1914,† and does nothing to guarantee the trade routes which are our weak point in time of war. France, seeking—excusably no doubt in the light of her ravaged fields—hungrily and perpetually after an ideal based on some granite rock of security, can interpret security only in terms of a guarantee of force, expressed in material figures. She is " profoundly convinced that the Covenant ‡ is quite insufficient to convince nations that if they are the victims of unjust aggression they will find in international relations the security which they will have renounced as a nation by proceeding to disarmament." § This line of thought expresses itself in a whole vocabulary of its own which makes great play with " security," " sanctions," " graduated obligations," and " regional pacts." In fact it has been accepted that, in default of a general treaty, " security pacts with other States are the only practical and possible form of guarantee," || a system which is perilously akin to the old pre-war pattern of group alliances.

It is not contended that France is necessarily wrong. She may be right, but if she is, Europe is treading again the old rut that leads to war.

Enough has been said to show that behind all discussions at Geneva lies the idea of security in terms of a guarantee of military force—a field of consideration outside the scope of naval disarmament which in its turn may be used as a pawn in order to obtain a concession in the military background.

Running parallel with the exponents of security are the seekers for a formula which will reduce armaments to the lowest figure compatible with security.

To this end elaborate questionnaires have been framed which stand as melancholy monuments to the faith that hopes to discover a precise factor of relationship in terms of security between the height and standard of Serbian conscripts, the potential output of oil in Roumania and the calibres of Japanese naval guns.

Undeniably useful as works of reference, these questionnaires, and the volumes based on them, are an unsafe line of diplomatic approach, for in them great problems of international relations tend to sink to the level of higgling about terms of military service, patterns of bombing aeroplanes and calibres of guns. The real trouble about these expert discussions on relative security is that they go round and round in an endless circle. How is one to discover a general coefficient of security? Each question is contingent on something else. You divide the number of Serbian reservists by the height of

* Rt. Hon. Sir Austen Chamberlain, House of Commons, November 24, 1927; Lord Cushendun, " tremendous liabilities," House of Lords, June 19, 1928.

† In 1911 Admiral of the Fleet Sir Arthur Wilson was evidently opposed to great military undertakings in Europe, and wished to limit Great Britain's action to a naval campaign. Sir Henry Wilson got his way, but Admiral Wilson may have been right on the broadest grounds of policy.

‡ That is Article VIII of the Covenant, embodied in the Treaty of Versailles, 1919.

§ M. Paul Boncour, League of Nations, Committee on Arbitration and Security, December 3, 1927.

|| Second Session, Commission of Arbitration and Security, February 20, 1928.

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the Alps, subtract the width of the Adriatic, add it to the square root of soundings in the Suez Canal, subtract the number of large Japanese cruisers; divide the result by the cube root of the horse-power of the latest French submarine, all into the sum of the length of the coastline of America divided by the mileage of Great Britain's trade routes. The result is a figure of defence relativity which means nothing. In this thorny region of technicalities one may wander round and round for days and years.

On the road will be found the remains of the Permanent Advisory Committee, the Temporary Mixed Commission, various Resolutions and finally the Preparatory Committee for the Disarmament Conference.*

America's Course.

Across these conflicting currents of European opinion America has twice steered a direct course. In 1921 she called a Conference at Washington. There Mr. Hughes put forward a proposition of naval disarmament based on concrete existing ships and pinned the Conference down to these lines. He did not enter into abstruse formulæ of relative security, but dealt in terms of actual ships and made a definite proposition to sink a number of them. The object of the Washington Conference was naval disarmament; and its object was attained.

The United States, Japan and the great States of Europe sacrificed a number of battleships in the cause of economy and international friendship. Great Britain in a great gesture of peace accepted the principle of parity in battleships. France, Italy, and Japan all reciprocated. The Conference under the ægis of the President ran on a broad-gauge line.

It could not, however, be repeated on the same scale. These great holocausts of battleships are only possible after a great war. At Washington, so to speak, the United States gave the party and were prepared to give the presents. Further efforts had to lie in the limitation of building programmes.

A bad gap, however, was left in the agreement. Unfortunately no limitation was imposed on cruiser tonnage. America had put forward a proposition limiting the total tonnage of cruisers and destroyers to 450,000 tons, but a thorny discussion arose on the question of submarines, which the States and Great Britain were both ready to abolish but which other powers wished to retain, and the Washington Conference, without deciding on cruiser tonnage, merely limited the size of cruisers to 10,000 tons and their gun calibre to eight inches (206 millimetres). It was through this loop-hole that disagreement subsequently crept.

On the termination of the Washington Conference the League of Nations once again continued its separate discussions on disarmament, and in December 1925,† constituted a Preparatory

* Constituted by the Council of the League, December 1925, met for First Session May 18, 1926.

† In accordance with a resolution of the Assembly in September 1925.

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Committee for the Disarmament Conference and issued an elaborate questionnaire covering most of the ground to be explored in the construction of a general plan of disarmament.*

The labours of the Preparatory Committee resulted in various drafts of a convention for naval disarmament—British, French and Italian. In the original British draft it was proposed to deal with classes of ships, and in each class limit the number and tonnage and the calibres of the guns.†

The French, on the other hand, proposed a limit of total tonnage with power to distribute and allocate it, as may be best "for the purposes of security and the defence of national interests." ‡

From these drafts the Preparatory Commission, in April 1927, drew up a further text. In this text the French, evidently in an endeavour to reconcile the difference of the two views, adopted a category of four divisions of ships §—(*a*) Capital ships, (*b*) Aircraft carriers, (*c*) Surface ships of less than 10,000 tons, and (*d*) Submarines—reserving, however, the right to alter, subject to informing the Secretariat of the League, the limits of each division so long as it kept within the total tonnage.

This classification of April 1927 is specially interesting, for it is on the same lines as that proposed in the Anglo-French compromise of 1928, which provoked such angry comments and was regarded as an attempt to outflank the American attitude at the Geneva Conference.

In 1927 President Coolidge steered once again into the shallows of naval disarmament and sent out invitations to a Conference. France and Italy would not come, and when the Conference met at Geneva on June 29, 1927, only Japan, America and Great Britain were present. An account of the proceedings has been given in a previous "Annual." ‖ It broke down over the tonnage to be allotted to cruisers. The United States put the figure at 400,000 tons and proposed to build 25 cruisers of 10,000 tons. This left Great Britain, if she built to parity in this class, only 150,000 tons for the smaller cruisers which she requires for her trade routes. Great Britain suggested a limitation of the larger cruisers to fifteen or any other number arranged by agreement. Japan, who all through displayed the friendliest spirit, endeavoured to bridge the gap, but the stars were not propitious; the atmosphere was vitiated by all sorts of misrepresentation; the Big Navy party in the States shouted that they had been jockeyed into parity at Washington and were being jockeyed out of it at Geneva. The Conference broke down. It broke down on the difference between the 8-in. and 6-in. gun. The difference was entirely straightforward. The Americans wanted size rather than numbers; the British wanted numbers rather than size.

* League of Nations Union, No. 210, Disarmament.

† British draft submitted by Lord Cecil, March 21, 1917, in Cd. 2888, p. 11, of 1927. The classes proposed are not given.

‡ French draft in *Idem*, 17.

§ *Idem*, p. 34, April 26, 1927, Third Session of Preparatory Commission.

‖ "Brassey's Naval and Shipping Annual," 1928.

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Technical Considerations.

And here a word must be said on technical considerations. Every problem of disarmament, unless inspired by some archangel of goodwill, must be considered in terms of security and be bound up with technical considerations. Each navy is bound to interpret questions in a technical light, and that light is bound to be coloured to some extent by its own needs. The United States has its own problems.* Honolulu is some 4,650 miles from the Panama Canal, and Manila is some 5,000 miles from Honolulu. On the other hand, she does not depend on the sea for the prime necessity of life—food. Her dominion is a single and compact whole. She is secure from all threat of military invasion and her future is her own. Great Britain's problem is more difficult. It is not merely her trade that is at stake, but her daily bread, and her dominions are scattered over the seas.

The British at Geneva do not seem to have harboured any intrinsic objection to total tonnage, but into the allotted frame of tonnage they could not fit parity in the larger class and sufficiency in the smaller class of cruisers. It has been said that we should be above these narrow technical considerations. But unless war is actually out of the question, it is the soldier and sailor who have to fight, and it is they who have to bear the terrible responsibility of defeat.

It is very difficult to discover a coefficient of disarmament relativity between the height standard of Roumanian recruits and the horse-power of a French submarine, but there is a very definite and commensurable relationship between the 8-in. and 6-in. gun. There was only two inches difference at Coronel between the 8-in. guns of the Gneisenau and the 6-in. guns of the Monmouth, but it was the difference between victory and defeat.

The collapse of the Geneva Conference brought with it Viscount Cecil's resignation from the British delegacy. He gave his reasons in the House of Lords on November 16, 1927, and they were heard by thousands across the Atlantic.

The American attitude on the question of the 8-in. guns had seemed to him " entirely wrong," but it also seemed to him madness to allow the negotiations to break down on such a point. †

Lord Balfour replied to him. He regarded the Geneva Conference as interrupted but not ended, and nothing would make him believe that the two branches of the English-speaking race were incapable of coming to a common agreement. In the House of Commons Mr. Ramsay MacDonald, leader of the opposition, moved a vote of censure. Mr. Bridgeman, First Lord of the Admiralty, replied: " It was not the question of parity with America that troubled us. It was our own security with which we are concerned, and our power in future to protect our sea communications against any hostile raid, of whose disastrous effect we had such bitter experience in the war.

* Admiral Hughes, Chief of Naval Operations, explained the figures of the United States cruiser problem to the Naval Committee in January 1928.

† Lord Cecil in the House of Lords, November 16, 1927, *Times*, November 17, 1927.

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. . . If they would not talk so much about anti-American feeling in this country and anti-British feeling in America the Conference would not have done any harm. . . . They had arrived at a great deal of common ground which need not be lost in future." * The House divided and Mr. MacDonald's motion was lost by 316 votes to 105.

The Kellogg Pact.

While the Geneva Conference was dragging on to an unfortunate end, two other proposals were under way steering a devious course in the troubled waters of peace negotiations.

One came to port with flag flying as the Kellogg Pact. The other developed into the Compromise, was caught in an autumn gale and wrecked. To take the former first, and begin at the beginning. It originated in France, and may be regarded as innocently conceived, except to those who are determined to discover an abyss of Machiavellian guile at the bottom of every despatch box, French, Italian, American, Japanese, German and British.

On the tenth anniversary of America coming into the war, April 6, 1927, M. Briand, the Minister of Foreign Affairs, addressed to the American People a message of welcome to the American Legion to say that the " limitation of armaments, sought so sincerely by our two Governments, responded to the ardent prayers of the entire French people. . . . France, in the organisation of her national forces, was giving at that very moment proof of her eminently pacific inspiration by viewing the reconstitution of her armaments from a purely defensive point of view." This address was followed in June 1927 by a proposal for a treaty of " perpetual friendship involving the absolute proscription of war " between France and the United States. † The Treaty was very short, and in Article I called upon the high contracting Powers solemnly to declare that they condemned recourse to war and renounced it respectively as an instrument of national policy.

Six months passed; the Treaty of Arbitration between France and America was due to expire on February 27, 1928, and in December M. Paul Claudel, the French Ambassador at Washington, thought (December 10, 1927) that February 6, 1928, the anniversary of the first treaty with the United States in 1778, would be an eminently suitable day to sign the treaty. This seemed a good idea, but it " occurred " to Mr. Kellogg that instead of confining themselves to a bilateral declaration they might have a " more signal contribution to the world peace " by obtaining the adherence of all the principal Powers to a declaration renouncing war as an instrument of national policy. ‡

* Mr. Bridgeman, House of Commons, November 24, 1927, *Times*, November 25, 1927.

† Pacte Générale de renonciation à la guerre, Ministère des Affaires étrangères, Paris, 1928 (published September 20, 1928). British correspondence with the United States Ambassador respecting the United States Proposal, Cmd. 3109, 3153, 1928. The original French draft of June 20, 1927, is in Cmd. 3109, p. 3; the later draft of June 23, 1928, is in Cmd. 3153, p. 7.

‡ Kellogg to Claudel, December 28, 1927.

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This was a considerable extension of the original proposal, but it satisfied the views of the French Government, who proposed to sign the Treaty immediately and then submit it for agreement by all nations (January 5, 1928).

Mr. Kellogg, however, thought that this procedure was open to objection, as a treaty, though acceptable to France and to United States, might be unacceptable to others.*

This was not quite so pleasing to the French Government, because the majority of the Powers were working for peace within the framework of the League of Nations and were bound to one another by reciprocal obligations and agreements such as those signed at Locarno in October 1925. †

Mr. Kellogg replied to the effect that an unequivocal and unqualified renunciation of war as an instrument of national policy could not violate the specific obligations of the Covenant nor conflict with the fundamental idea and purpose of the League of Nations. ‡ M. Claudel, in answer, said that the French Government was quite ready to proceed with the proposal, but desired to point out that if any signatory State failed in its promises, the other signatories would be released from their engagement towards the offender, nor would the Treaty deprive any one of the right of legitimate defence.§ It was with these reservations that the French Government announced its consent.

The next date was April 13, 1928, when a draft of a proposed treaty was transmitted by the American ambassador to the Governments at London, Berlin, Rome and Tokio. ‖

Sir Austen Chamberlain replied a few weeks later (May 19) in a favourable sense. He, too, had certain reservations. The British Government had to respect its obligations arising out of the League of Nations and the Locarno Treaties. These it must honour. Violations by any party would free the other States from the terms of the Treaty towards the offending party. The right of self-defence, too, remained inalienable. ¶

There were, also, certain regions of the world, the welfare and integrity of which constituted a special and vital interest for the British Empire's peace and safety. Their protection against attack was to the British Empire a measure of self-defence. His Majesty's Government could only accept the Treaty on the distinct understanding that it did not prejudice their freedom of action in this respect.

A slightly altered draft of the Treaty was prepared giving expression to these reservations. **

The President himself declared the right of every nation to maintain an adequate national defence.††

* Kellogg, January 11, 1928. † Claudel, January 21, 1928.

‡ Kellogg, February 27, 1928.

§ Mr. Kellogg laid emphasis on this point in a speech before American Society of International Law, April 28, 1928.

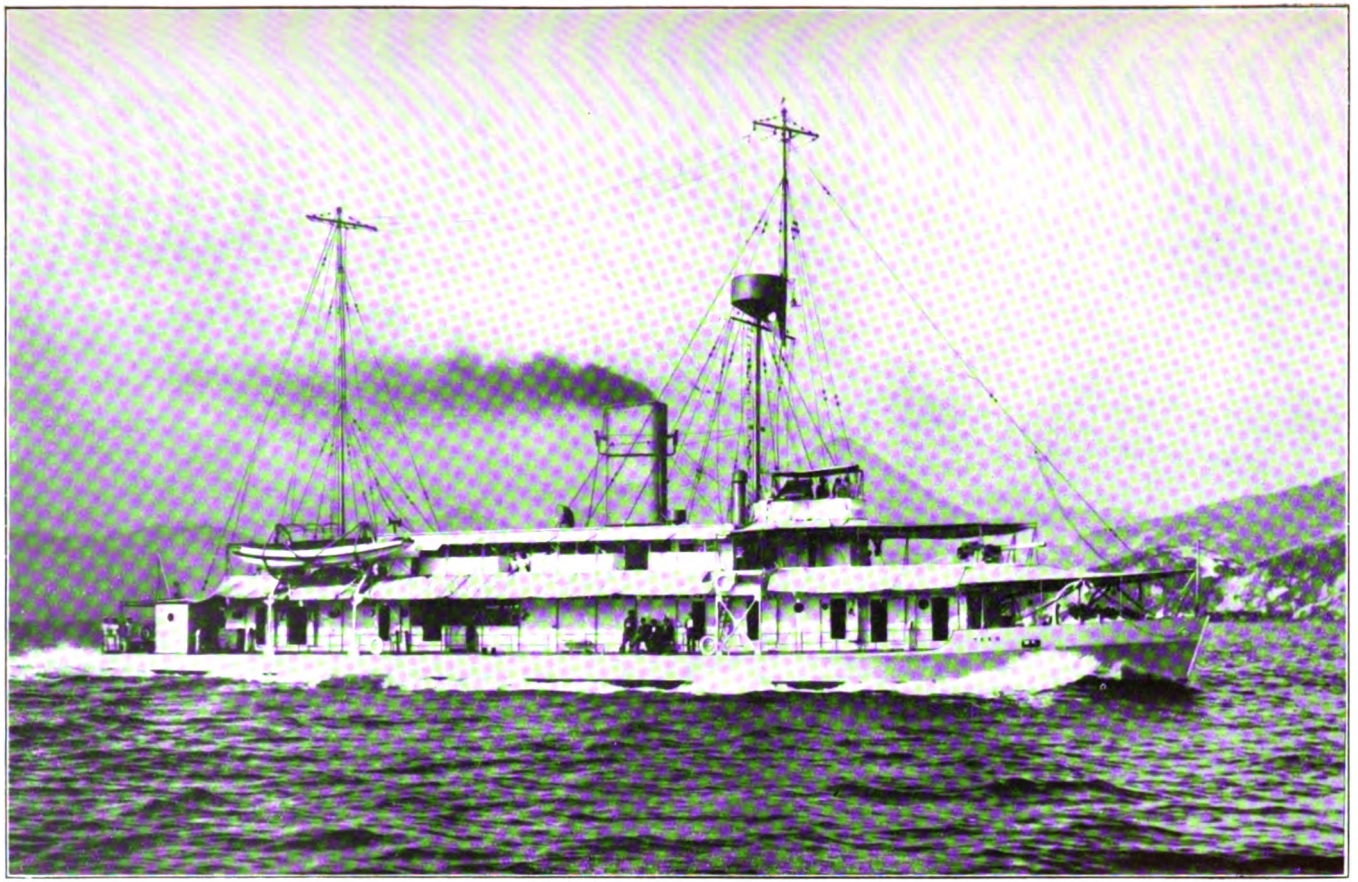
‖ April 13, 1928.

¶ Sir A. Chamberlain to Mr. Houghton, May 19, 1928. See Sir Austen Chamberlain's speech in House of Commons, July 30, 1928. Debates 220/1831.

** June 23, 1928, text in *The Times*, August 25, 1928.

†† State Convention of American Legion, August 15, 1928, *The Times*, August 16, 1928.

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(First Turbine-Driven Type on the Upper Yangtse.)

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On August 27, 1928, there was a great gathering at the Quai d'Orsay. Mr. Frank Kellogg was there representing the President of the United States, and there the Peace Pact was signed by Germany, the United States, Belgium, France, Great Britain, Canada, Australia, New Zealand, South Africa and the Irish Free State, India, Italy, Japan, Poland, and Czecho-Slovak.

The High Contracting Parties all solemnly declared that they condemned recourse to war for the solution of international controversies, and renounced it as an instrument of national policy in their relations with one another.

The Pact represents unquestionably a sincere expression of what the world requires. It may be doubted, however, whether its spell is strong enough to bind the furious storms of national feeling which periodically sweep over the world. To some it may seem little more than a pious declaration. It represents the precise antithesis of the French policy which aims at building a collective barrier against war out of instruments of war. There is no trace in it of commitments, obligations, sanctions or regional pacts. If the League called on its members to take measures and sanctions against an offender, there is no sign of any obligation in the Kellogg Pact which would require the United States or any one else to participate in such measures. On the other hand, it is the expression of a strong body of public opinion in the United States and in Great Britain and all the Dominions which is determined not to be jockeyed into war. It is a stern challenge to the more ardent devotees of force, and affords a sound strategical position for the war against war.

The Compromise.

Where two ships are navigating in a narrow channel they may collide. This is what happened to the Geneva Conference and the Compromise.

The Preparatory Committee for the Disarmament Conference was constantly being urged and pestered to get on with its work. The three drafts which were to serve as a basis of naval disarmament have already been mentioned. Important speeches were made on this draft at the meeting of April 5, 1927,* and a year later, on March 9, 1928, Sir Austen Chamberlain had an important conversation with M. Briand at Geneva. If France would concede a point in naval matters, Great Britain would probably yield a point on the military side. Early in June 1928, there were conversations between the French and British naval representatives at Geneva, and on July 30 Sir Austen Chamberlain stated in the House of Commons † that conversations had been proceeding with the French in the hope of finding some compromise on the differences at issue in the Preparatory Committee for the Disarmament Conference.

Wild rumours were soon afoot. It was an abrogation of the Washington Treaty. It was an attempt to jockey the United States into a limitation on its 8-in. gun cruisers. Mr. Fred Britten,

* Papers on Limitation of Naval Armaments, Cmd. 3211, 1928.
† House of Commons Debates, 220/1838.

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Chairman of the Naval Affairs Committee of the House of Representatives regarded it as another British attempt "to retain domination of the seas through subversive diplomacy." *

The draft of the compromise reached the United States early in August.†

The mystery hanging round its terms proved a great asset to the "Big Navy" party in the States. All the big geysers were soon spouting hot and cold, and the flood of talk about it disturbed the rejoicing over the Kellogg Pact.

On September 21, 1928, the Hearst newspapers published the text of a letter from the Quai d'Orsay to French ambassadors including a summary of the agreement.

Its nature should be carefully noted. First of all it can not be called a disarmament agreement in any substantial or definitive sense of the word. It was merely a proposed basis of discussion as to the categories of vessels to be subject to limitation, when the subject came up for discussion by the Preparatory Committee for Disarmament.

The following four classes were to be subject to limitation :—‡

(1) Capital ships, that is, ships of over 10,000 tons or with guns of more than 8-in. calibre.
(2) Aircraft carriers of over 10,000 tons.
(3) Surface vessels of or below 10,000 tons armed with guns of more than 6-in. and up to 8-in. calibre.
(4) Ocean-going submarines, that is over 600 tons.

The eruption which followed indicates very clearly the danger of having two lines of approach to disarmament. The Geneva Conference was one; the Preparatory Committee quite another. At the Geneva Conference the British Government attached great importance to a sufficiency of smaller cruisers with 6-in. guns.

When the Preparatory Committee got to work, this point of view, naturally enough, found expression.

Early in June 1928 the French made a suggestion to the British representative on the Preparatory Committee that the limitation of surface ships should be confined to ships armed with guns over 6 in. The British Ambassador replied on June 28, 1928,§ expressing the agreement of the British Government and stating that this would enable the British Government to withdraw its opposition to the inclusion of trained reserves in the estimate of military strength. The French replied on July 20, to say they were ready to come to an agreement, but suggested three propositions made by the French Chief of the Naval Staff, Admiral Violette.

(1) That 10,000-ton cruisers be subject to limitation, and that a maximum equal tonnage be allocated to all the Powers, each Power, however, actually engaging not to construct beyond a certain tonnage to be determined by its needs during the period covered by the suggested Convention.

* *The Times*, September 10, 1928.
† British Note was despatched July 30, Cmd. 3211, p. 27.
‡ *Daily Express*, September 22, 1928, and Cmd. 3211, p. 27.
§ *Evening Standard*, October 5, 1928, quoting the *Echo de Paris*.

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(2) That the same reservations be applied to submarines.

(3) That categories of submarines be specified—those above and those below 600 tons—only the former category being subject to limitation.

On July 28 the British Government accepted these proposals and agreed to the terms being communicated to the United States, Italy and Japan.

There is no necessity to read into the agreement any intention of disconcerting the United States. The Preparatory Committee was constantly being badgered for not producing something. It had to produce something and it is natural that the views presented by the British should be on much the same lines as the views presented at the Geneva Conference.

The result, however, was unfortunate. To put it briefly, the Preparatory Committee ran crash into the wreckage of the Geneva Conference. The note gave the Big Navy party * in the United States a lead which enabled it to bring out a long suit of press trumps—European intrigue, subversive diplomacy, refusal of parity, etc. The Hearst press was in full cry, and having obtained the terms of the agreement published them on September 21. It trumpeted out its views, which were lapped up greedily. America was pictured as being manœuvred into the position of the " bad boy of the disarmament class " ; Great Britain was to build cruisers stretching to the moon, while America was to be restricted in the construction of the larger cruisers appropriate to her special circumstances. Out of the secrecy shrouding the agreement huge shadows were conjured.

The American note in reply was delivered on September 28, 1928.†

The Government of the United States considered that any limitation of naval armaments to be effective should apply to all classes of combatant vessels. The Anglo-French Agreement provided no limitations whatever on 6-in. gun cruisers or on destroyers or submarines of 600 tons or less. No one could deny that such ships had a very high offensive value, especially to any nation possessing well-distributed bases in various parts of the world. . . . The limitation of cruisers of or below 10,000 tons armed with guns of more than 6-in. would impose restrictions on types peculiarly suited to the needs of the United States. The United States could not accept the distinction. The proposal made at the Geneva Conference was now presented " in a new and even more objectionable form " which still limited the large cruisers, suitable to American needs, but frankly placed no limitation whatever on cruisers carrying guns of 6-in. or less calibre. The proposal was obviously incompatible with the American position at the Three Power Conference and was even more unacceptable.

The Government of the United States had earnestly and consistently advocated real reduction and limitation of naval armaments.

* Lieut.-Commander Hon. Joseph Kenworthy, House of Commons Debates, March 22, 1928.

† Full text in *The Times*, September 29, 1928, and Cmd. 3211, p. 34.

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It would be happy to continue such efforts but could not consent to proposals which would leave the door wide open to unlimited building of certain types of ships of a highly efficient combatant value.

In a word, the Anglo-French Agreement was definitely rejected by the United States. The door, however, was left open for further negotiations. The Government of the United States remained willing to use its best efforts to obtain a basis of further naval limitation satisfactory to all the naval powers, which could be accomplished by permitting any of the Powers to vary the percentage of tonnage in classes within the total tonnage. Such a proposal would be sympathetically considered by the United States.

The Future.

The note, while friendly, was couched in very direct terms, and it may be concluded that the United States will proceed with her cruiser-building programme.

In December 1927 she had eight large cruisers under construction, and in February 1928, after an explanation of naval needs by Admiral Hughes, Chief of Naval Operations,* Mr. Butler brought in a Construction Bill asking for fifteen cruisers, five to be built each year ending June 30, 1929, 1930, 1931.

No time limit was placed for their construction, and the President was empowered to suspend it in the event of an international agreement for disarmament. The Bill passed the House of Representatives, but still awaits the Senate's approval, and will come up for discussion in December 1928.

The Big Navy party would very much like to see the Cruiser Bill take precedence of the " declaration of international morality " (that is the Kellogg Pact) in the deliberations of the Senate, and it will be interesting to see whether it does.

Meanwhile Great Britain, having dropped three cruisers in two years from her programme, has five large cruisers and eight building, a total of thirteen.†

The collapse of the Geneva Conference followed by that of the Anglo-French Compromise must tend to discount the value both of Conferences and of the League of Nations deliberations. Here are two attempts at disarmament, whose principal results apparently have been to supply fuel for those who wish to stir up the fires of national pride and international discord.

On the other hand, one can weigh against them the very real success of the Washington Conference. It seems clear, whether for better or worse, that naval considerations are beginning to be regarded in an international light, and nations do not remain so free to pile up armaments as they think fit. Conferences and deliberations have entered into the scheme of diplomacy and have attained at Washington striking results.

But there the deliberations ran on a broad-gauge line. In

* Twenty-six cruisers for fleet work, 9 for focal points, 6 for convoy, 2 for destroyer flotillas—total, 43.

† In the two years 1927 and 1928 Great Britain has laid down three cruisers instead of six. Mr. Bridgeman, March 15, 1928. House of Commons Debates, 214/2143.

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Europe they run on a narrower gauge, and it is the jolting that occurs between the two lines that almost upsets the international train. On the whole, Mr. Kellogg's Pact seems to be the sounder line of goods. It may not show much sign of fruit, but it has a pleasing scent and offends nobody. Mr. Kellogg is reported to have said that his pact was not in any immediate relation to the Cruiser Bill. There would seem, however, to be some sort of distant relationship between a Pact solemnly renouncing war as an instrument of national policy and a Bill for the construction of fifteen new cruisers.

Armaments would appear to be related in some degree to the probability of being attacked, and if there is no probability of being attacked, their *raison d'etre* disappears.

Yet in 1928 the United States Navy Department is asking for 100,000 tons of cruisers in excess of the total it declared at Geneva to be sufficient for American needs.* Nothing, however, can be gained by criticising these demands from this side. We should only sink deeper into the unfriendly morass of recriminatory cruiser arithmetic. One thing can be stated with confidence. There is no spirit of naval chauvinism in Great Britain. It can only be hoped that the people of America will supply the moral force by which the Kellogg Pact may become

"... a Resolution and a Pact,
To make Eternal Truth be present Fact."

Italy sent her reply to the Anglo-French compromise about October 6. Its drift was not favourable. Italy was prepared to accept any figure, however low, provided it was not exceeded by any other Power on the Continent of Europe. The Italian Government favoured a limitation by global tonnage, which would leave to every State the right to utilise its tonnage according to its own particular requirements and so give to the lesser armed States a measure of compensation for their inferiority.† There the matter stands, but where the Preparatory Committee for Disarmament Conference stands, or will stand, is not so easy to discover.

As Lord Cushendun says, "It is not easy to see what we can do if, whenever we manage to come to an agreement with any Power on this complex question, we are to be denounced as furtive conspirators or hopeless blunderers for not having achieved more."‡

Questionnaires may supply questions but the answers do not always agree. "To-night will be unravelled many a strange riddle," said Faust, on his way to the Brocken. "And many a strange riddle will be put to-night and not unravelled," replied Mephisto. Geneva is a much more respectable place than the Brocken, but these mountainous heights have a way of speaking the same language, and, seen darkly through the clouds, the stately gatherings of the League sometimes bear a strange resemblance to the gyrations of a witches' circle.

ALFRED C. DEWAR.
Captain, R.N.

* American Naval Policy, H. C. Bywater, *Nineteenth Century*, March 1928.
† *The Times*, October 9, 1928.
‡ *Times*, October 26, 1928.

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CHAPTER VII.

Post-War Developments in Naval Machinery.

Previous issues of the "Annual" have contained interesting articles on the developments in marine engineering during the current year, these having, however, been largely confined to the progress in the mercantile marine, very little information being given regarding the corresponding advances in our own or in other navies. There is, of course, little doubt but that the most advanced land practice is adopted as far as possible in the machinery installations of all warships, and there can be little that is secret as regards the individual design of the various components. On the other hand, however, the disposition of the machinery, its weight and performance are factors which exercise a very appreciable effect upon the military value of the vessel, and for such reasons it is rare that any substantial information becomes available.

Naval engineering, in all classes of ships, has, however, made appreciable advances during the last decade, and it is proposed in this article to trace the trend of development during this period, and to discuss briefly the lines on which progress must inevitably proceed under the existing conditions. It is first necessary to give a brief description of the conditions existing at the end of 1918.

The close of hostilities saw the disappearance of both the cylindrical boiler and the reciprocating steam engine (for propulsion purposes) from all but the least effective vessels in the principal navies of the world. A few old ships provided with this type of machinery were retained pending the completion of their useful lives, but, save for auxiliary vessels and the like, the steam turbine had undoubtedly become the principal prime mover. The British Navy had been the pioneer in the development of both the turbine and the water tube boiler, and it is fitting here to recognise the courage and foresight of those responsible for the bold adoption of these, then, revolutionary appliances.

The desire to obtain greater efficiency had led to experiments being made with different forms of reduction gearing in the British and U.S. navies, the former adopting mechanical transmission while in America the so-called electrical propulsion was favoured. The difficulties encountered with each form of drive appear to have been rapidly surmounted, for, by the end of the war period vessels of all types were in being or under construction, using mechanical gears, while the electrical methods had been successfully applied to capital ships of the largest size; owing to limitations of weight and space the latter system had proved unacceptable in the smaller,

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high-speed craft. The German Navy had also produced torpedo craft in which the Fottinger transformer was fitted as a speed reduction device, but this form of hydraulic transmission appears to have been less successful than was anticipated, and its use was not continued. The general position then was that, while the geared turbine was being generally applied in vessels ranging in size from torpedo craft to large light cruisers, the majority of the capital ships in all navies were still propelled by direct-coupled turbines.

The problems associated with the burning of oil fuel at high rates of combustion had engaged the attention of naval engineers throughout the world and had been satisfactorily solved in various ways. In this development also the British Navy was the pioneer, her first "all oil" ships being the torpedo boats of the 1905 programme. These were followed shortly by torpedo boat destroyers fitted solely to burn oil fuel, which was also adopted to supplement the coal supplies in the larger vessels. The further progress in the use of oil fuel was rapid and in 1916 there were in existence vessels of all classes which relied solely on oil to feed their furnaces. It was, indeed, fortunate for the Allies that these two developments, geared turbines and oil-fired small tube boilers were in so advanced a stage at the outbreak of hostilities: without them, the production of many of the high-speed, light craft, which rendered such invaluable services, would have been impracticable.

The war period itself was not characterised by any remarkable machinery innovations as regards surface warships, those which were built at this time showing a gradual evolution towards lighter and ever lighter machinery weights and a general reduction in the spaces required for an installation of given power. This progress is well illustrated by Table A, which gives typical weights and spaces in the latest design of warships of different classes in 1914 and in 1918: these figures are merely representative and do not refer to any particular vessels. The advances made were solely due to the change from coal-fired large tube boilers supplying turbines directly coupled to the propeller shafts, to installations comprising geared turbines, which derived their steam from small tube boilers of the three-drum type fired with oil fuel.

TABLE A.

Class.	Date.	Weight of machinery, horse-power per ton.	Floor area of machinery spaces, horse-power per square foot.	Type of machinery, etc.
Capital ship .	1910	13·0	3·0	Coal. Large tube boilers. Direct coupled turbines.
Cruiser . .	1910	24·0	4·0	Ditto.
Capital ship .	1918	20·0	6·0	Oil fuel. Small tube boilers. Geared turbines.
Cruiser . .	1918	40·0	7·5	Ditto.

The steam pressures in the various navies appeared to have become standardised at about 200 to 250 lbs. per square inch, and,

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although experimental installations employing steam at very moderate (80° to 100° F.) superheat had been constructed, this latter innovation appeared unlikely to be generally adopted pending the development of a type of superheater suited to the requirements peculiar to the Naval Service.

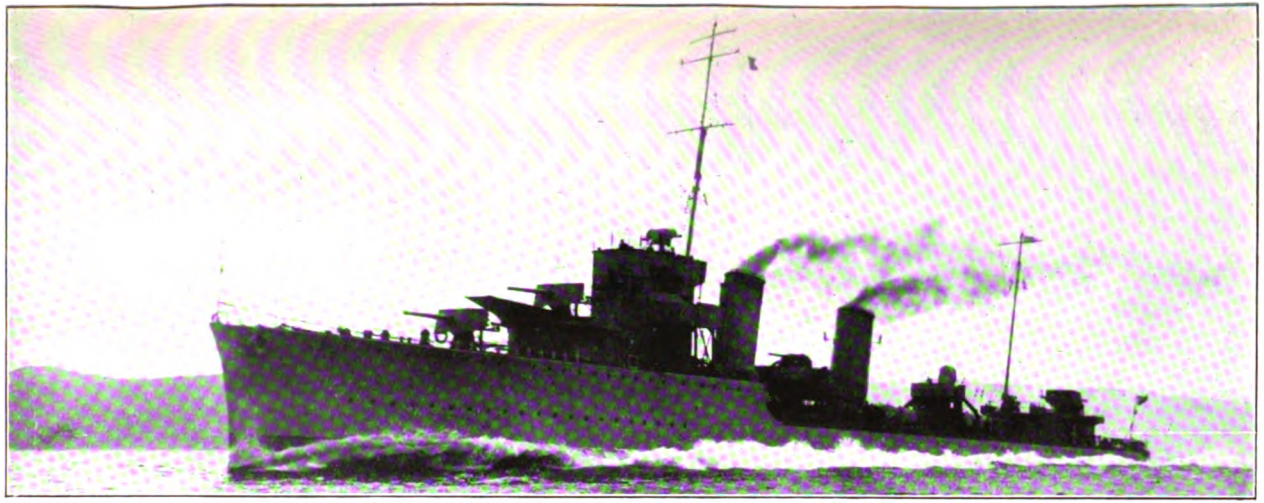
Brief mention must be made of the various forms of auxiliary engine that found their place in the warships of the period. The auxiliaries in general consisted of reciprocating or direct acting steam engines, driving the pumps, fans or winches with which they were associated.

At the same time turbo-driven auxiliaries were being introduced on a small scale, their use being in general confined to destroyers and fast light cruisers, in which craft the saving in weight so made possible was considered of greater importance than the greatly increased steam consumption associated with a change from the reciprocating auxiliary. Even in such vessels it was not considered practicable in most navies to employ turbines for any but the larger auxiliaries.

The progress of electric propulsion in the U.S. Navy, coupled with the universal use of electricity for power purposes ashore in America, led naturally to a correspondingly wide application of electrical methods to driving auxiliary devices of all descriptions. Thus not only were many of the pumps, etc., in connection with the main propelling units driven by such means, but also electricity was pressed into service for working the gun-loading gear, for even the main armament of battleships, for capstans, winches, refrigerators fans and, most important of all, for steering the vessels. The extent of this application may be judged from the report that in battleships of the New Mexico class, built in 1918, the provision of electric generating plant (apart from that required for main propulsion purposes) amounted to 6 machines of a total of 1,800 kw. The comparative figures for contemporary capital ships in other navies appear to average about 4 machines of 120 kw. each, aggregating some 480 kw. It will no doubt be remembered that, according to Press reports, the turret guns of H.M.S. Invincible were electrically worked, while both in that ship and in some of the earlier armoured cruisers the forced draught fans for the boilers were motor-driven.

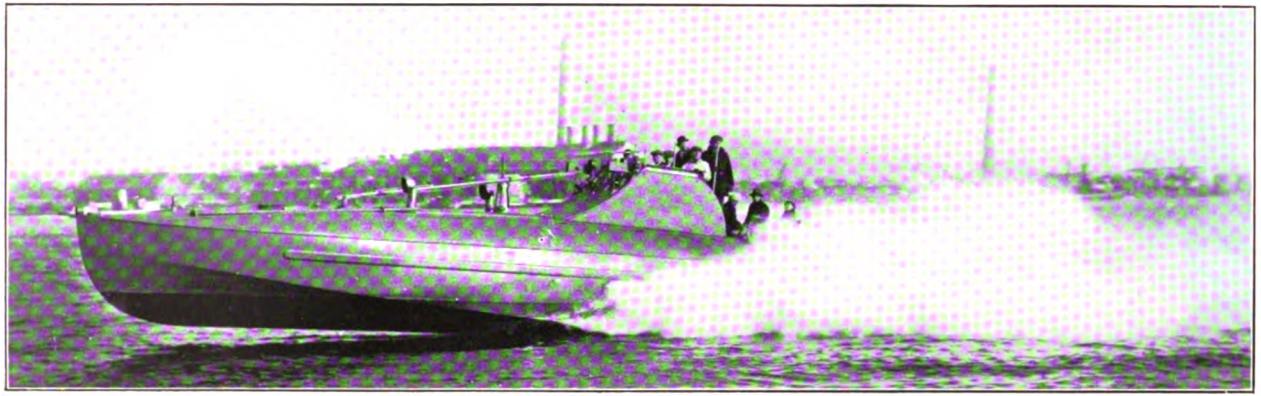
The electric generating plant in all navies had assumed proportions of some importance and, although in the majority of cases the dynamos were driven by reciprocating steam engines, the use of the turbo generator was being gradually extended, the type offering advantages as regards reliability, durability and efficiency as well as adapting itself better to the spaces available. The Diesel engine had found a place in this connection, and all capital ships of the British Navy subsequent to 1903 were provided with one or more of these machines. The objects of this provision were not only to promote economy but also to render available electric power when the boilers were not alight. The use of the Diesel for this purpose does not seem to have been favoured in other navies, but the oil engine was in some cases employed for providing electric power in

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CHILEAN DESTROYER SERRANO, 1,430 TONS.

(Sister Ships: Orella, Riquelme, Hyatt, Videla, and Aldea.)



NETHERLANDS COASTAL MOTOR-BOAT.

(*45-foot type; armed with two 18-inch torpedoes and four machine guns.*)

(*Photographs by courtesy of the builders, John I. Thornycroft & Co., Ltd.*)

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small vessels such as T.B.D.'s, where paraffin-driven generators were not uncommon.

It may be of interest to note two other developments in the auxiliary field, both being in connection with the condensing apparatus; these were firstly the introduction of various forms of steam or hydraulic ejectors for removal of the air from the main condensers, thus replacing the heavy and uneconomical direct-acting air pumps, and secondly, the use of scoops as substitutes for the main circulating pumps, engines which are normally responsible for a very large proportion of the total auxiliary steam expenditure. These advances were at that time confined chiefly to the American Navy, although the use of scoops is reported to have been tried in the British destroyers of the Tribal class.

A very general use seems to have been made in all navies of the exhaust steam from the auxiliary engines, which were arranged to work against a moderate back pressure. The low pressure steam so rendered available was usually passed to suitable stages of the main turbines where it was able to perform an amount of work sufficient to give a net gain of economy, despite the enhanced steam consumption of the auxiliaries consequent upon the back pressure. Other uses for this steam were for feed heating or for working the evaporators.

Electric motors were being introduced to an increasing extent for driving the more general ship auxiliaries, unconnected with the main propelling plant. Thus ventilating fans, refrigerators, deck winches, etc., were all driven electrically, so reducing greatly the lengths of steam and exhaust piping and at the same time avoiding needless heating of the living spaces.

The petrol engines used in the early types of submarine had entirely disappeared, having been supplanted by the Diesel engine in nearly all submarines. The British K Class submarines, which were developed during the war for fleet purposes, were fitted with steam-turbines and oil-fired boilers for surface propulsion and were undoubtedly the fastest submersible vessels ever built for any navy. The veil of secrecy which has enveloped the history of submarine development is so obscure that little reliable data regarding the types of machinery employed, the horse power provided and the corresponding speed on the surface is available. There is, however, little doubt that the Diesel engine of moderately high rating was brought to a very fine state of perfection in the German U boats, as can be readily seen by inspection of those engines which are now in use for various commercial purposes in this country.

So much then for the general position as regards naval machinery at the end of the war period.

The next three years saw the navies of the world busily engaged in cancelling those war contracts which were no longer required, in completing certain vessels already in hand and, most important of all, in planning new construction which would meet the probable needs of the future and in which the lessons of the war were to be embodied. In the nature of things it is evident that while the design of the lighter craft could and probably did keep pace with

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the experiences gained in action, the same cannot be said regarding the capital ships of which no nation possessed any thoroughly up-to-date examples in 1918. At that date Great Britain had, however, the four powerful battle cruisers of the Hood class under construction: three of these were cancelled, the name ship of the class being completed successfully in 1919. The United States and Japan both had battleships under construction, and it is evident from the dates at which these were laid down that the designs of these vessels must at least have been appreciably affected by the experiences of the war; and notably those of Jutland. The latter end of 1920 saw the placing of orders by the British Government for four new capital ships, the reported horse power of which was 160,000 (each) fully bearing out the able analyses, made in this and other publications, of the probable trend of development in vessels of that type. Generally speaking, however, there seems to have been a short breathing space, wherein no definite developments in naval machinery became known to the public.

At this juncture the conference for the limitation of Naval Armaments was held at Washington, and the Treaty which eventually emerged was destined to exercise a far-reaching effect upon the design of the vessels coming within its provisions. It is unnecessary to quote at length the various important features of this agreement, while the effect of these limitations upon the general design of the various classes of vessels has been ably commented on in previous numbers of the "Annual." The main portion of this article deals, however, with the effect of certain clauses of the Treaty upon the machinery installations, a subject that appears to have been little discussed in public, and one, which, while no doubt primarily of interest to the professional engineer, greatly affects the military value of the vessels concerned.

The principal restrictions agreed upon at Washington concern the limiting calibre of the guns permitted in various classes of vessels, and, more important still, the maximum displacement of individual ships that might be built under the Treaty was rigidly defined. The total tonnage of all the capital ships maintained by each nation was also fixed, the upshot being that Great Britain was permitted to build two of this class of vessel, while it was agreed that certain battleships nearing completion in other navies might be finished. Apart from these exceptions, however, the building of such units ceased throughout the world.

Great Britain's two battleships, Rodney and Nelson, are thus the sole existing examples of their class that may be said to be likely to embody the lessons of the world war. The general features of these vessels are too well known to need description, but some comments on their machinery installations may be of interest.

The outstanding novel feature is undoubtedly the adoption of superheated steam for driving the main turbines. The boilers are of the three-drum small tube type, provided with superheaters of Admiralty design and fitted to burn oil fuel only. It is noteworthy that only eight such boilers are fitted, this being the smallest number ever provided in a capital ship since the Majestic class was built.

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The evaporation of each of the Nelson's boilers is sufficient to provide the steam required for the production of nearly 5,700 horse-power at the main turbines, together with the necessary proportion of auxiliary power. This compares with an average boiler output equivalent to 1,500 horse-power in the Majestic, in which vessel cylindrical, coal-fired boilers were fitted.

Information is lacking regarding the weight and space required for the Nelson's steam generating plant, but the boiler installation in the Majestic weighed about 110 lbs. per s.h.p., occupying a total floor area of about 3,600 square feet. The weight of a very moderately forced Yarrow boiler for shore purposes is about 25 lbs./s.h.p., while the floor area occupied by eight 6,000 horse-power units of this type averages some 3,200 square feet. These figures, while being mere estimates, give some idea of the advances made in this respect during the past 30 years.

The main propelling machinery in the Nelson is reported to develop about 45,000 shaft horse-power at full speed, and consists of two sets of impulse turbines driving the propeller shafts through mechanical reduction gearing. These vessels are, then, the first battleships in the British Navy to be fitted with this form of propulsion, which, it is interesting to note, has been arranged to give a propeller speed appreciably lower than that in previous turbine-driven capital ships. The advantages accruing from the arrangement are reflected not only in the relatively high speed obtained in such a vessel on so small an expenditure of power, but also in the reduced fuel consumption. These turbines are said to be fitted with special arrangements which enable a marked reduction to be made in the steam demands under cruising conditions, this being, of course, reflected in the fuel bill.

It will be seen then that in these vessels, apart from the introduction of superheated steam, there is little noteworthy in the machinery installation which marks, however, the final stage in the general adoption of the geared turbine, now a *fait accompli* in all classes of ship. The small tube boiler had not been previously employed in battleships, but had none the less entered the capital ship class in the case of the battle cruiser Hood. The marked advance as regards economy in steam consumption in these two vessels, coupled with the somewhat greater provision of fuel (reported to be about 4,000 tons as compared with 3,400 tons in their immediate predecessors) is a distinctive feature, which gives them a large steaming radius.

The latest battleships in the U.S. Navy, the Maryland class (1921–23), employ oil-fired large tube boilers and electric propulsion, the steam being moderately superheated. The Japanese battleships of the Mutsu class (1920) are reported to have geared turbines, but no information has been published regarding their boiler equipment, which is believed, however, to be of the small tube type.

The Treaty has, also, resulted in the production of a number of most interesting designs of cruiser, all of the standard displacement of 10,000 tons, and none of which may be armed with any gun of calibre greater than 8 in.

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TABLE B.

10,000-TON CRUISERS.

	British.	United States.		Japan.	France.	Italy.
		First Two.	Later Class.			
Number:						
Built . . .	7†	2*		Nil.	2*	Nil.
Building . . .	6	6		6	2	2
Projected . .	2	15		2 1	2	2
Armament . . .	8 8-inch 4 4-inch A.A. 8 T.-tubes	10 8-inch 4 5-inch A.A. 18 T.-tubes	9 8-inch ? ? 	10 8-inch 4 4·7-inch A.A. 12 T.-tubes	8 8-inch 8 3-inch A.A. 6 T.-tubes	8 8-inch 16 4-inch A.A. 8 T.-tubes
Maximum speed .	32 kts.	32·5 kts.	?	33 kts.	34–35 kts.	35 kts.
Horse-power . .	80,000	107,500	?	?	120,000	150,000
Fuel	Oil §	Oil	Oil	Oil	Oil §	Oil
Protection . . .	Under-water and 4-in. curved protective deck	Practi-cally nil	Slight	Under-water, but very little else	Practi-cally nil	Practi-cally nil

* Practically completed—mostly in trials stage.

† Including two for Australia.

‡ Suffren, the third ship, and probably later, has light protective belt and coal, as well as oil, to give additional protection.

§ 3,400 tons of fuel, giving great endurance and radius of action.

The table gives a comparison of the published leading particulars of these cruisers as produced by the principal Naval Powers. This, while possibly not entirely correct as regards horse-power, speed, and protection, forms an interesting commentary on the manner in which these features may be varied, while maintaining the displacement of the vessels at the standard figure. In such a comparison the British designs appear to be somewhat deficient as regards speed, and, as this factor is so largely dependent upon the design of the machinery, it is necessary to discuss somewhat fully the factors influencing the weight of the power installation, if a full understanding of the possible causes of such differences is to be obtained.

The Washington standard displacement includes the weight of the hull, armour, guns, machinery, and all fittings together with a proportion of the stores, ammunition, etc., but excludes that of the fuel and of the reserve feed water. It will be evident, then, that not only must a preponderance of weight in one direction, such as guns or protection, be counter-balanced by a correspondingly light weight in some other part of the equipment, but also that the weight of the machinery cannot partly be offset by a reduction in the load of fuel. In other words, although very economical machinery may make it possible to reduce the amount of fuel that must be carried in order to realise a given endurance, such cannot in general be adopted without the sacrifice of some other feature in the vessel, as economy

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in fuel consumption usually means the provision of additional devices and thus a corresponding increase in weight. To this extent, then, the Treaty tends to penalise economical performance, but for reasons shortly to be developed, a low steam consumption may in some directions actually tend to save weight.

The weight of the machinery is, of course, primarily determined by the horse-power to be developed, and for similar designs varies almost directly in proportion with that factor, although the horse-power developed per ton of weight (s.h.p. per ton) increases slightly as the gross output of the plant is enlarged. The horse-power in turn is dependent upon the required speed, upon the form and length of the vessel, and upon the propulsive efficiency of the propeller, the last being greatly influenced by the revolutions of the shafts.

The second main variable in this respect is the type of the main engines and of their associated boilers and auxiliaries. The horse-power necessitated to drive a 10,000-ton cruiser at a speed of about 30 knots is of the order of 60,000, depending, of course, upon the features already mentioned. In order to provide this within the limited weight that can be spared for the purpose, it has been found essential to employ small tube boilers, mechanically geared turbines, and to adopt oil for fuel: any other existing type of machinery (*e.g.* electric propulsion, large tube boilers) or of fuel can only be embodied in vessels of this design by sacrificing other features to provide the additional weight thus required for the machinery.

We arrive, then, at this much common ground between the various designs, given which, the principal remaining factors that may make for differences in weight are the working stresses in the various parts, the rate of heat transmission in the boilers and condensers, the steam consumption of the machinery and, finally, the types of material used.

The value of the working stress used for design purposes depends primarily, of course, upon the strength of the material under the known (or assumed) conditions, and upon the degree of accuracy with which such stress can be estimated. The designer, taking the latter point into account, assumes what he considers to be a reasonable figure, allowing a margin of safety, dictated by his personal experience and judgment. It is clear that in cases where weight and expense are not of great moment, while considerations of reliability are paramount, the margin allowed will be a very generous one; ample thickness may be given in some cases to provide for a long life under the influence of corrosion without requiring the renewal of parts; the areas of bearing surfaces may be so amply proportioned that the consequently light loading results in little wear and so adjustments are infrequent. On the other hand, the parts may be designed on very small margins, the scantlings being reduced to a minimum, while the working loads on the bearings may be so high that only a few hours' service can be obtained at full load without overhaul being required. The engines of the ordinary motor car and of the aeroplane afford striking examples of two such extremes of design.

It is a logical design procedure to work to very fine limits in

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high-speed craft such as destroyers, the margin being progressively increased in the larger and more important craft, and this has in effect been the usual practice in all navies. The actual value of the margin allowed can only be determined by experience, which thus accumulates in the most highly stressed designs and is then passed on gradually to the more conservatively rated units: in fact, the torpedo craft forms a proving ground in which advances are originally tested before their adoption first in cruisers and then in capital ships.

The rates of heat transmission in the boilers and condensers determine the areas of the tube surfaces and thus the weights of these parts, which average between them some 33 per cent. of the total machinery weight. Now, other things being equal, the temperature of a heat transmitting surface depends upon the rate of transference, becoming higher with increase of this factor. The strength of the material in general is less at high temperatures than at low, hence the margin of safety in a boiler tube (subjected to given stresses, due to internal pressure and the like) becomes definitely less as the rate of heat transmission is increased. The inner and outer walls of the tube must necessarily be at different temperatures if any flow of heat is to occur: the layers of the material thus attempt to expand by different amounts, and, being unable to do so, a so-called "heat stress" is set up in the tube. The extent of this stress depends upon the temperature gradient referred to, the latter increasing as the rate of transmission is made larger. Thus the margin of safety is further affected by the rate of forcing.

Deposits of scale, mud, etc., unavoidably accumulate upon the tube surfaces of steaming boilers, the effect being to diminish greatly the amount of heat that can be transmitted. The operator under such conditions may raise the furnace temperature in the endeavour to pass the desired heat quantity, and this has the effect of elevating the temperature of the tube material itself, thus further reducing its strength.

It will be evident, from a consideration of the foregoing remarks, that highly forced boilers will not only have a low margin of safety when clean, but also that this may be dangerously reduced when the heating surfaces become dirty. In other words, the reliability of such units is much less than that of more moderately rated boilers. The reduction in weight to be achieved by such means is not proportional to the change in heating surface, as this latter only accounts for about one-third the total weight of the boiler, the dimensions and weight of the remaining portions being largely independent of the extent of the heating surface. Thus, a reduction of 20 per cent. in the heating surface corresponds to one of only some 8 to 10 per cent. in the boiler weights—a relatively trivial saving to set off against the depreciated reliability that accompanies it.

An inadequate provision of condensing surface may result in failure to obtain the desired rate of heat transmission when the tubes become dirty on service. This means in effect that the designed vacuum and horse-power may be mere paper figures, which cannot normally be realised in practice. This disadvantage of inadequate cooling surface may, of course, be partly surmounted by over-

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forcing the boilers or by providing sufficient boiler power to meet the condition referred to: the first of these alternatives hazards the durability, while the second entails extra weight. The condensing surfaces of vessels designed for tropical service must be liberally proportioned in order to provide for the reduced heat transmission occasioned by the warm sea water: if this is not done, then the vessel may not be able to attain the speed required of her. It is not perhaps generally realised that the maximum speed of which any turbine-propelled ship is capable in tropical waters is necessarily less (often considerably less) than that which she can attain in more temperate climes.

The published speed and horse-power of a ship are not necessarily the maxima that can be realised, and this point is of great importance in attempting to compare the machinery weights of two vessels.

The steam and fuel consumption of the machinery has an appreciable bearing upon its weight. The dimensions of the steam pipes, boilers, condensers and of many of the auxiliaries depend at source upon the quantities of steam and fuel handled at full power, and thus to this extent economy in these particulars also promotes reduction in weight. On the other hand, however, the efficiency of the machinery cannot be improved beyond a certain point without the provision of larger and heavier prime movers. Waste heat likewise cannot be saved unless additional apparatus such as air preheaters, feed heaters and the like is installed for the purpose. The correct balance between these conflicting features is a matter calling for considerable skill and judgment and is one of the principal features which differentiate designs of the same date. Economy under cruising conditions is of great importance in warships, and a high efficiency of the main engines can, in general, be well maintained down to a low power at the cost of slight extra weight. It is one of the chief claims of the advocates of the " electric drive " that this system provides a very high degree of economy at low powers. The claim is undoubtedly a true one, but at least as good results may be obtained from a mechanically-geared installation provided with suitable cruising stages, and this can be done on less weight than in the case of the electrical system.

The degree of duplication of the auxiliaries and of the steam and other piping systems obviously influences the machinery weight to a very large degree. This question is largely a matter of policy and determines the extent of the probable dislocation of the machinery under shell fire: a most important consideration in a warship. Duplication will obviously be employed to the fullest possible extent in capital ships, while in destroyers the limitations of weight may be such as to prevent the provision of any but the barest essentials.

Finally we come to the possibility of using special materials such as alloy steels, aluminium alloys, and the like, as is common in aircraft practice for the purpose of weight reduction.

Very light alloys are of comparatively recent introduction, and their use for parts of large marine engines is likely to be limited to relatively unimportant fittings, unsubjected to stress.

The use of special alloy steels with the object of taking advantage

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of their improved physical qualities is somewhat hampered by the difficulties which have been found in providing reliable articles of large size when made of such materials. Many of these alloys are dependent for their superiority upon the results of heat treatment, which it has been found impossible to apply with the certainty of obtaining uniformity of product in large masses.

The tendency is now towards the production of alloy steels in which superior qualities are obtaining without the application of heat treatment. Thus, pending development along these lines, or failing practical methods of surmounting the " mass effect " in heat treatment, the use of materials of this type will be chiefly restricted to small parts of the machinery, exercising but little effect upon the overall weight.

The statement is sometimes made that machinery weights have been considerably reduced in a particular vessel by the use of special high-grade materials, but it will be evident from the foregoing that in such cases there will be an element of uncertainty introduced and the reliability of the machinery will have been prejudiced. Such a practice may be justified by particular circumstances, but in general cannot be upheld for valuable fighting ships, especially where these may be required for extended services on stations remote from modern engineering shops.

The foregoing brief discussion now enables us to appreciate the possible inferences to be drawn from a comparison of the published horse-powers and/or speeds of different vessels designed for the same standard displacement, and these may be summed up as follows :

(*a*) An advantage in one particular, such as speed, can only be obtained at the cost of some other feature.

(*b*) A given horse-power can only be developed by machinery of a certain definite weight, unless sacrifices in respect to reliability and durability are made in the lighter design.

(*c*) The maximum horse-power that can be developed by a given installation is greatly affected both by the condition of the boiler and condenser surfaces and also by the temperature of the sea water. The speeds realised under trial conditions in a new ship in temperate waters may be very different from those on service in the tropics.

(*d*) Finally, engineering knowledge is so widespread that there is little likelihood of any substantial advantage being obtained in this respect by the vessels of one Navy over another.

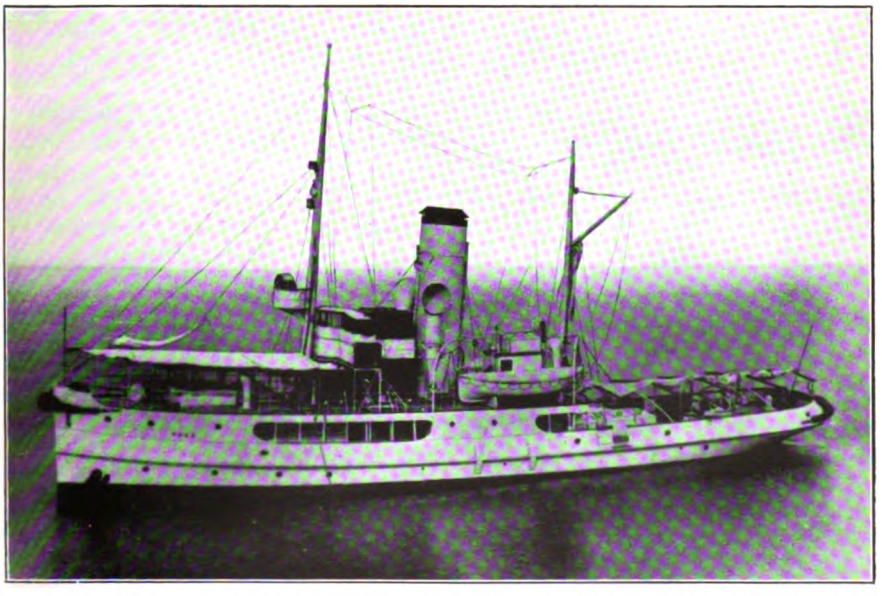
It is perhaps needless to state that the foregoing generalisations presume an equal excellence of design and manufacture in the vessels under comparison.

The foregoing analysis should leave little doubt as to the present trend of naval machinery design. Reduction of weight is of paramount importance, and, while some advantage in this respect is possible at the cost of reliability, in general this requirement has more or less standardised the types of machinery that can be fitted. Obviously it will be the aim of all designers to reject superfluous fittings to the utmost limits considered practicable, while at the same time taking the fullest advantage of modern developments in

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ARGENTINE SLOOP SAN JUAN, 790 TONS.
Sister ship San Luis. Both designed for Hydrographic Service.



ARGENTINE SEAGOING TWIN-SCREW TUG TOBA, 137 FEET LONG.
Sister ship, Mataco ; both driven by trip'e-expansion engines.
(*Photographs by courtesy of the builders, Hawthorn Leslie & Co., Ltd.*)

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the field of metallurgy. Scientific research has already been greatly stimulated, and investigations into questions such as heat transmission and the like are being energetically pursued with the objects of reducing weight and improving efficiency. Future advances are likely therefore to be mainly in matters of detail rather than in the adoption of new methods of propulsion.

The engineering improvements ashore, and also in the mercantile marine, during the corresponding period have been largely concerned with improving the economy of the plant, weight saving being of importance only where it conflicts gravely with other considerations. The many interesting developments in the above fields, such as the use of extra high-pressure steam, the adoption of air preheaters, of feed-water economisers, and of " bleeder " feed heating, etc., are all features which demand the provision of extra space and weight, being thus debarred at present from the Naval Service except to a limited degree and in special cases: indeed, with the exception of the first mentioned, there appears no immediate likelihood that such improvements can be included in the machinery of warships.

The future line of progress is thus likely to be in the direction rather of employing ever higher superheat, as the growth of metallurgical knowledge permits this to be done, coupled with such advances in steam pressure that experience may prove to be practicable.

The marked increase in the use of the Diesel engine for propelling and for auxiliary purposes in the mercantile marine, warrants the inclusion of a few words on the possibilities of this type of prime mover for Naval purposes. The sole advantages of the Diesel engine lie in its lower fuel consumption and the ease and speed with which such machinery can be brought into operation. The reliability and durability are in any case less than that of the steam-engine and this would be even more true of the advanced designs necessary to conform to the weight and space requirements of warships. The fuel economy offers but limited advantages owing to the displacement restrictions imposed by the Washington Treaty; the increased endurance and lesser demands upon the refuelling services would, however, be of military importance, while the annual fuel bill for the fleet might be greatly reduced, although possibly at the cost of some increase in upkeep expenses.

The main consideration is, however, whether engines of this type and of sufficient power can be accommodated in warships. Slow-running heavy oil-engines are available in units up to 15,000 horse-power each, but the weight of four such units, aggregating 60,000 s.h.p., would be of the order of 5,000 to 6,000 tons; that is to say, 50 per cent. of the displacement of a Treaty cruiser would be required for the main engines alone. This compares badly with the figure of 15 to 20 per cent. for the *total* machinery weight of such a vessel, as quoted by Sir G. Thurston in his article on Cruisers (page 60, the " Annual," 1925). In the case of a battleship developing (say) 50,000 s.h.p. by means of such engines, the weight of the main engines would be of the order of 4,500 tons, or 10 per cent. of the

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displacement: this is about 1,800 tons heavier than all the main and auxiliary machinery in a steam installation. Evidently heavy oil-engines of the slow-running mercantile type are inadmissible in warships on the score of weight alone, quite apart from considerations of height which are also sufficient to rule them out of court.

The weight and space may be reduced, however, by running the engines at high revolutions. This course entails smaller power units and would involve difficulties in coupling up the large number of engines required to provide the high aggregate power necessary to compete with steam.

There is little information regarding the present limits of size in high-speed Diesel engines, as such units have little commercial application as yet. It is probable, however, that medium-speed engines running at (say) 300 revolutions could be obtained in units of 6,000 horse-power. Really high-speed engines, with working speeds of the order of 1,500 to 2,000 revolutions, have been produced in sizes up to about 800 to 1,000 horse-power.* The weight of these latter types is of the order of 3 lbs. per horse-power when constructed of special materials to aircraft requirements, but the use of ordinary materials, of higher factors of safety, coupled with the provision of greater reliability and more extended running life, would increase this figure to the region of 30 to 40 lbs. per horse-power. The necessary speed reduction devices and the various essential auxiliaries entail still further additions to the weight, the total of which would hardly be less than about 100 lbs. per horse-power.

This is an appreciable advance upon the figures quoted for the directly coupled slow-speed installation, but even so, such machinery would be likely to account for an inacceptably large proportion of the total displacement, observing that, on the basis of the figures given in Sir G. Thurston's article, previously quoted, the steam machinery of a Treaty cruiser should not weigh more than about 60 lbs. per horse-power. It is thus not altogether surprising that examples of the use of heavy oil-engines for main propulsion purposes in warships are few and far between. The sole existing cases are believed to be the cruising installations in the British minelayer Adventure and in the German cruiser Königsberg. It is known that in the former case the Diesel engines are coupled to the propeller shafts by electrical means, but information is not available regarding the weight and space requirements of this installation.

Recent information in the German Press (*Deutsche Tagezeitung* of September 8, 1928) discloses the interesting fact that the main machinery of the projected 10,000-ton armoured vessel is to be of the Diesel type. The information purports to show that this vessel will not be strictly a cruiser, but will be armed with 11-inch guns, while her speed will be intermediate between those of the battleship and of the cruiser. It is thus hoped that she can defeat the one by virtue of superior armament, while being able to elude the more powerfully armed battleship. This makes it probable that a

* See paper by Mr. A. E. L. Chorlton before the British Association at Glasgow, 1928.

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speed of some 26 to 28 knots will be available, requiring the provision of some 30,000 horse-power.*

Power of this order could be developed by slow-running Diesels on an engine weight of about 2,500 tons, or (say) 25 per cent. of the displacement; it is thus apparent that high-speed machinery is likely to be provided, possibly employed in conjunction with mechanical reduction gearing, as in the case of certain German merchant ships. Much emphasis is laid upon the very light weight machinery to be fitted in these vessels, and the relatively low speed and horse-power quoted above is perhaps an illuminating commentary on the handicap imposed upon the designer by the use of even ultra-light engines of this type.

S. H. P.

* Since this chapter was written, it has been stated that the new ship will have a speed of 26 knots. There will be twin sets of Diesel motors, developing 50,000 horse-power. In proportion to their power, they will be very light, one unit of h.p. being developed for each 17½ lbs. in weight, which is less than one-sixth the ratio of weight to power in the general run of Diesel engines in 1918. The radius of action is stated to be 10,000 miles at 20 knots. The British cruisers of the Kent class have a radius of 10,400 miles at economical speed of 11–14 knots. The French cruisers of the Duquesne class are credited with a radius of 5,000 miles at 15 knots; the U.S.S. Pensacola with 13,000 miles at 15 knots; and the Japanese Nachi with 14,000 miles at 15 knots. It has been estimated that at low speed, the German vessel could proceed to the Far East without refuelling.

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CHAPTER VIII.

The Submarine Mine.

Introduction.

An adequate appreciation of the submarine mine has yet to be written, and will perhaps, not be forthcoming until the full naval history of the war has been written and analysed. In the meantime the mine possibly does not receive the study and attention that so invaluable a weapon deserves. Why should this be so ?

The mine no longer carries the obloquy which once its use inspired, and there is nowadays no tendency to shrink from making full use of its powers. It is, however, a weapon somewhat apart from the Navy in general. It cannot be carried by every vessel as can the gun and the torpedo ; it is in fact but rarely carried by any vessel of the Fleet. It is adaptable to many types of war vessels from cruisers downwards, and the British 20th Destroyer Flotilla, operating from Harwich, laid no fewer than 22,000 mines in the Bight without mishap and without requiring any escorting forces. But when war vessels are acting as minelayers they must, as must any minelayer with mines on board, keep out of the range of enemy guns, and, consequently, they cannot then be employed as a part of the fighting Fleet. The tendency therefore is to build, or adapt, special vessels to lay mines, and the result is inevitably to segregate the mine from the Fleet, and the mining service tends to become a thing apart.

Only a small proportion of naval officers have any intimate connection with the mine, and it is not unnatural to suppose that as a consequence the application of the mine to naval warfare may not develop as rapidly as is desirable. This state of segregation, however, need not have such an effect provided there is a sufficiency of experienced officers to provide for the needs of the naval staff and the more important posts in the technical mining service. Provided also that there is that close collaboration between the operational staff and the technical authorities that is essential to ensure the development of design to meet the policies in view, and to consider new policies as a result of new developments. A special difficulty arises in the study of the subject since, unlike the case of most other weapons, there is no up-to-date literature dealing with the technique of the mine, that is purchasable. The technique of the subject is, moreover, exceptionally subtle, and for effective development practical experience is essential.

In this brief monograph on the subject the present state of affairs has been dealt with so far as is possible from an analysis of

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the various notices of the subject that have already appeared in books of reference and other records of the recent war.

Some Opinions.

Before the war submarine mining had been studied and developed thoroughly by two navies only, those of Germany and Russia. Other countries were generally content to adopt one or other of the products of the armament firms of the day. As Mr. Winston Churchill says in "The World Crisis," speaking of Great Britain:

> "The Admiralty, before the war, had not expected the mine to play an important part. In a war on the surface of the sea the weaker navy would no doubt use such a weapon to hamper the movements of its superior antagonist; but for the stronger fleet, the fewer minefields the better. These conclusions, which at the time were not ill-founded, were upset by the changes for which the prolongation of the war gave time."

In introducing the Naval Estimate of 1920–21, the First Lord of the Admiralty stated:

> ". . . mining was considered in pre-war days to be a minor and unimportant branch of naval warfare. . . . The utility of mines was emphasised early in the operations of 1914, and the science of mining gradually assumed a position of extreme importance in naval strategy and tactics."

But perhaps the best brief appreciation hitherto published is that in the "Encyclopædia Britannica" (1926), under the heading of "The Naval World War," and written by Captain Alfred C. Dewar, R.N.:

> "The power of the mine remains one of the lessons of the war, and the combination of a minefield, supported by heavy guns either afloat (as in the Bight) or ashore as at the Dardanelles) remains a very difficult proposition, for the mines offer an insuperable obstacle to heavy ships approaching, and the guns are able to prevent minesweepers approaching the mines. The paravane offered only an uncertain solution to the problem which can only be solved by destroying the heavy guns or by capturing the forts, as the Germans did at Osel in 1917, but even there three dreadnoughts were severely damaged by mines. The mine must not be regarded as a merely defensive weapon. It is an immobile weapon, but it can be very offensive, and in the Bight, and the Dardanelles, proved more than a match for the stronger fleet."

The Mine—A Strategical Weapon.

The mine is a strategic weapon of very great variety of type and of manner of use. It is a strategic weapon in the sense that aircraft, and the submarine, for example, are strategic weapons. The gun and the torpedo, on the other hand, are tactical weapons of relatively limited application. It is necessary, in considering the uses of the mine, to appreciate from the beginning to what nature of weapon it belongs.

The Mine—Its Place in Naval Warfare.

The object of naval warfare is to secure command of the sea so that it may be possible to move troops overseas, or to receive supplies of fuel, food, raw material, or munitions in safety. This can only be

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done completely by destroying the enemy's forces. It can be done partly by a nation having such a preponderance of strength that the enemy is forced to keep either in his ports or fairly close to them.

Generally, in the warfare of the past, it has happened that one combatant is considerably stronger than the other, with the result that the weaker combatant, not being able to contest the command of the sea, has to confine himself to attempts to interfere with the transport of troops, or the arrival of supplies, of his enemy. As all the world now knows, from studying the war of 1914–18, the submarine has presented to the weaker combatant a weapon of the highest importance for this very purpose. It has, moreover, provided the weaker nation with a means of protecting his ports and his scantier forces, since the close blockade of an enemy's port, in the face of submarines is a manifest impossibility. It was the war of 1914–18 that first demonstrated the actual value of the submarine, since, prior to that, no submarine had been used in warfare. But long before that date the mine had been used for very similar, though less extensive purposes.

By some naval writers the submarine has been described as a mobile mine: a mine that can move itself, inflict damage, and pass on to another objective. The submarine is, of course, much more than that, but a certain similarity between the two weapons can be noted and may be helpful in assessing the value of the mine. The advent of the submarine has led to two factors of the very greatest importance in the future of mining: factors that do not seem to have been universally grasped, but which might nevertheless be deduced by any one studying the naval side of the 1914–18 war.

The two factors may be summarised thus:

(1) The *submarine* can carry *mines* and a *submarine minelayer* is a weapon of offence that can be used by the weakest of nations.
(2) The mine is the submarine's worst enemy.

It would be wrong to conclude from the above that the mine provides a complete antidote to the submarine. It does not, nor can any conceivable development of the mine ever achieve that end; nor, to complete the argument, is a submarine ever likely to be able to protect itself completely against the mine. The two weapons will therefore continue to exist, though it is possible, but not evident, that the mine can be transformed into a still better anti-submarine weapon than it is at present.

The place of the mine in naval warfare may, for these days, be summed up as follows, and attention is particularly drawn to the added value of the mine that has been produced by the development of the submarine:

The mine is a weapon that can be used for operations against the enemy ranging from the protection of one's own ports to an attack upon an enemy port.

The Mine as a Weapon for Navies of Varying Strength.

No nation having a seaboard or navigable rivers can be so weak as not to be able to arrange for mine protection for the more vital

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of its ports and waters. Most nations can afford a minelaying submarine or two, by which means mine warfare can be carried right into enemy waters. In certain cases also mine warfare can be carried right into enemy harbours by means of that other modern adjunct of the mine, the coastal motor boat. The stronger naval Powers need the mine no less, both to restrict the enemy in his own waters, where nowadays modern conditions prevent a close blockade, and also to counter his attacks, whether by submarine or other craft. It follows that every nation needs mines. The weakest Navy should make the mine its first weapon, and the stronger Navy should make the mine one of its first.

The Mine in 1914–18.

It may be useful to recount briefly the main uses to which mines were put by the principal naval belligerents of 1914–18, viz. Germany and Great Britain. To begin with, it should be noted that Germany commenced the war with large stocks of efficient mines and the intention to use them ruthlessly on every possible occasion. Great Britain, on the other hand, was a doubtful believer in the value of the mine, and at the outbreak of war had but relatively small stocks of what unfortunately proved to be an inefficient mine. By 1918, however, the situation had changed so far that Great Britain was a firm adherent of the mine and had ample stocks of thoroughly efficient designs.

In 1918 the main uses to which mines were put were thus :—

By Germany :

(1) To attack enemy trade routes and approaches to ports.
(2) To attack enemy war vessels, but far less resources were put into this than into (1).
(3) To defend home waters.

By Great Britain :

(1) To attack enemy's submarines.
(2) To harass German coastwise traffic.
(3) To protect certain waters.

Germany's main mining policy was therefore to assist the general submarine campaign against Great Britain's supplies and movements of troops.

Great Britain's main mining policy was to attack German submarines.

All German mines subsequently to 1915, excepting those laid in defence of her own coasts and by the raiders Moewe and Wolf, were laid by submarines. The bulk of British mines were laid by surface craft, the exception being those laid off the German coast. It should be noted that Germany was unable to use surface minelayers in pursuit of her main policy, and that Great Britain had insufficient command of the sea to lay mines very close to German ports with surface minelayers. On many occasions, however, mines were laid by fast British minelayers, generally destroyers, within easy reach of the German coast. Both sides largely achieved their objects.

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German mines obtained a considerable share of the casualties inflicted on British Shipping during the submarine campaign and accounted for no fewer than 259 merchant vessels, not to mention a large number of patrol and minesweeping vessels. On the British side the mine was one of the most important factors in finally defeating the submarine campaign, and by the end of the war had accounted for no fewer than 42 submarines, or, if mined nets are included, 49.*

A Summary of Strategic Uses.

Stated generally the strategic uses of the submarine mine are:

(*a*) To prevent the enemy using certain waters except at serious risk.
(*b*) To protect or control the passage of friendly or neutral traffic.
(*c*) To harass the enemy in his own waters.

From what has already been said, and from what the student of naval warfare may deduce from the many published volumes dealing with the recent war, it is amply evident that the mine is now, more than ever before, a naval weapon of the first importance, essential to every maritime country.

The mine is best looked upon as an obstacle which no one will knowingly face. The moral effect of mines on even the hardiest of seamen is enormous and far reaching, and mines do undoubtedly achieve a large part of their effect by moral effect alone in keeping an enemy away from waters which may be mined. Consequently the possession of mines by any country is in itself an asset of military value.

A Mining Policy.

Each country must form its own mining policy, and this must accord with the general naval policy, but in forming the latter the new values of the mine, as shown by the war of 1914–18, must be taken into full account. A naval policy based on knowledge obtained prior to the termination of the recent war should certainly be revised in view of the now increased utility of the mine. Before the war, or rather before the results of naval warfare in this war became known, it might have been impossible or unwise to attempt aggressive action close to enemy ports, but, as has been indicated, new possibilities now exist by virtue of, for instance, the minelaying submarine.

A mining policy may well be considered under the following headings:—

(1) The defence of ports and territorial waters.
(2) The protection of coastwise traffic by lines of mines parallel to the coast.
(3) The attack on enemy lines of communication.
(4) The attack on enemy territorial waters.
(5) The attack on enemy ports.

Naturally it will be important to know the resources of the enemy, whether he possesses forces capable of aggressive action, whether he is likely to attempt invasion, whether he has submarines, whether these are arranged to lay mines and so on. Every scrap of

* "The World Crisis," Winston Churchill, Part II., p. 361.

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information as to his forces should be taken into consideration and a mining policy may need to be continually revised. A part of any mining policy should be the provision of a reserve of mines, and the means of laying them to meet circumstances which cannot be foreseen. As an example, a country might have a good general mining policy which would be followed on the outbreak of war and might then find itself perhaps with an insufficient reserve to avert or harass an attempted invasion. An ample reserve must be a feature of every mining policy.

The Hague Convention.

As was made fully evident during the war of 1914–18, a country may not observe the conventions of war laid down in times of peace. The Hague Convention of 1907 laid down a number of rules relating to the use of mines, many of which were not observed by belligerents and which have presumably by now lost what force they had.

There is, however, one clause which should be considered, viz. Article 1, Clause (2).

> "It is forbidden to lay anchored automatic contact mines which do not become harmless as soon as they have broken loose from their moorings."

Great Britain observed the ruling and would certainly have been at a disadvantage had she not, since mines frequently break adrift and the neighbourhood of mined areas would have become dangerous to her own and neutral traffic. The Hague Convention has been mentioned in connection with the formation of a Mining policy since its contents should at least be studied.

Notifying Mined Areas.*

The British practice in notifying areas mined by British forces or dangerous due to enemy mines was by means of the official notices to mariners, which were in some cases reproduced in the press. It is not, however, necessary always to announce an area as being mined provided that adequate arrangements are made by notifications, patrols or other means to prevent any neutral vessel running into danger. For instance, the Folkestone-Grisnez Barrage was not announced as a mined area, but Admiralty Notices to Mariners were issued from time to time giving the regulations for crossing the Channel and for entering both English and French ports, emphasising the necessity of using the Folkestone Gate and for hugging the French coast, etc. In this area the majority of mines were below the maximum draught of most vessels, and the risk would not have been comparable with that of a surface minefield. These arrangements proved quite adequate.

In the case of the Northern Barrage, the areas A and C were declared dangerous, and at first no mention was made of B containing only deep mines which were not a danger to any surface craft.

An Admiralty notice to mariners was approved by the Allies

* See chart facing p. 122.

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and issued on April 27, 1918, some weeks before laying commenced. It was prefaced by the following statement :—

> "In view of the unrestricted warfare carried on by Germany at sea by means of mines and submarines not only against Allied Powers but also against neutral shipping, and the fact that merchant ships are constantly being sunk without regard to the ultimate safety of their crews, His Majesty's Government gives notice that on and after May 15, 1918, the following area will be established in the North Sea dangerous to all shipping, and should be avoided."

Then follow the latitude and longitude of the boundaries of the prohibited area. In addition light buoys were laid in certain positions to mark this area, these buoys also serving as useful departure points for the minelaying operations without indicating at all exactly the position of the mines.

The chart * shows the area off the Danish, German and Dutch coasts, and in the Bight of Heligoland proclaimed by the British Admiralty as being dangerous to shipping. This area was nowhere within three miles of a neutral coast. Three miles is, of course, the international legal limit, but it is naturally inconvenient to a neutral to have mines within so short a range, and it may be advisable to make concessions, as was done on several occasions by the British Admiralty. In the case of the mined area in the Bight, the Dutch laid a line of lightships and buoys along its western limit in order to assist their own traffic. They also themselves mined their own waters in certain localities to prevent the passage of belligerents within the three-mile limit.

Classification of Mines.

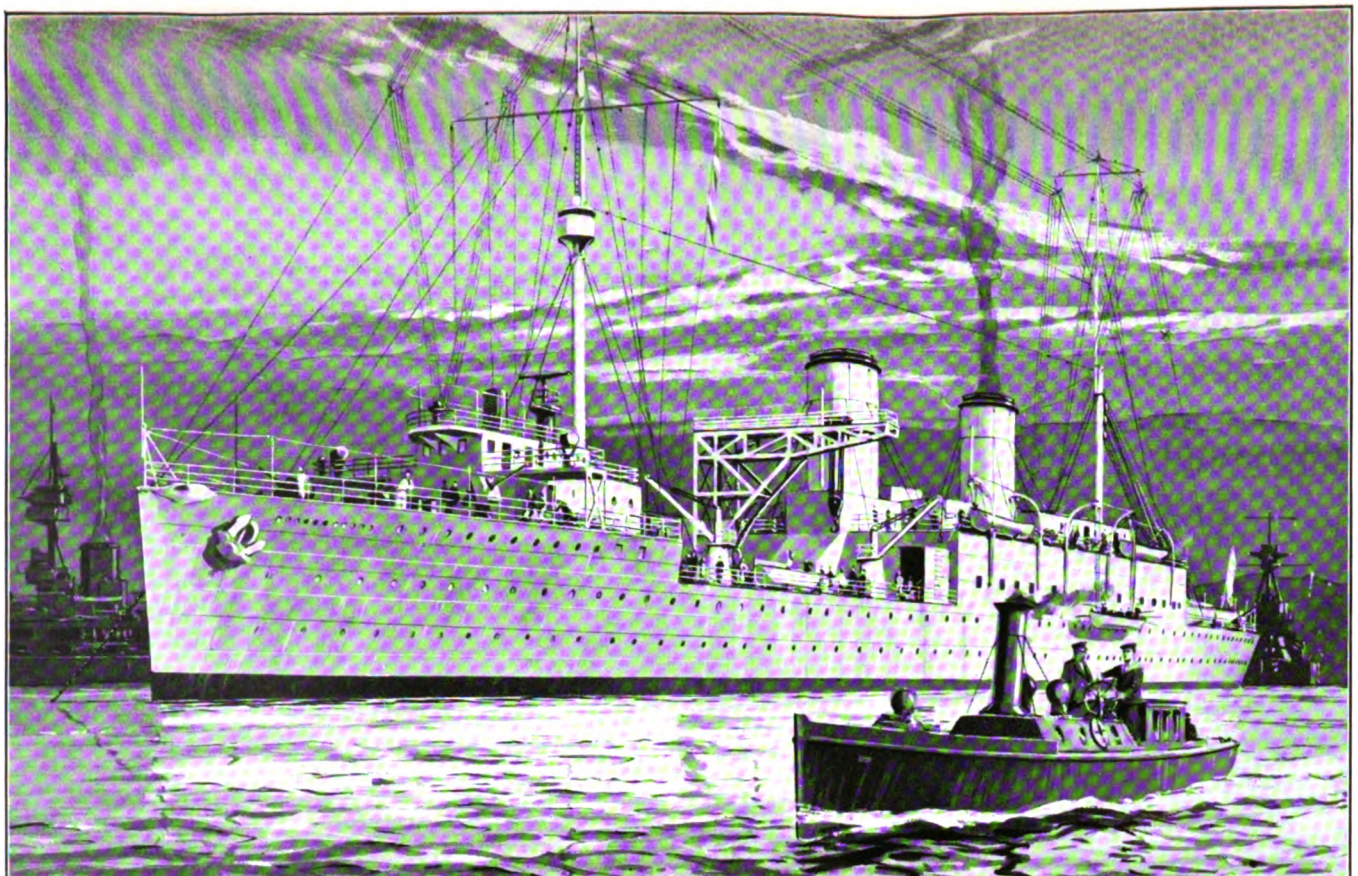
Although in the great war a number of new types of mines were produced and tested, some of them of great intricacy intended especially to deal with submarines, yet the result has been actually to simplify design and practically to eliminate all but two types of firing device. These are the now well-known Herz Horn and the electrical principle employed in the American Mines of the Northern Barrage. The former of these provides for the simple contact mine, the latter is especially useful for the creation of an anti-submarine barrage and as an anti-paravane device.

Some important improvements directly due to the war are the present-day accuracy of depth taking and the far wider range of depth of water in which mining can be carried out. Before the war the standard mine had only about 50 fathoms of moorings, a range of depth settings of from 6 to 20 feet, and an accuracy of depth taking of perhaps plus or minus 3 feet. At the present time a usual standard mooring is nearly 200 fathoms, and 1,000 fathoms is possible, though admittedly with a very considerably heavier mine unit ; now also the mine can be set to any depth below the surface of from 3 to 300 feet, with an accuracy of depth taking of plus or minus 1½ feet.

All the mines can be divided into two main classes, viz. controlled or non-controlled, according to whether their firing gear is under the control of human agency or not.

* See chart facing p. 122.

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(By courtesy of the builders, Vickers-Armstrongs, Ltd.)

H.M. REPAIR SHIP RESOURCE, 500 FEET LONG, 7,500 S.H.P.

(Fitted with Parsons Geared Turbines and Yarrow Boilers.)

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A controlled mine is one which has its firing energy placed somewhere outside it where it can be cut off or applied as desired.

A non-controlled mine may contain its own energy or may obtain it from the sea, either by virtue of the head of water over it or from attributes of the water itself.

No way of supplying the firing energy to a controlled mine other than by means of an electric cable has yet been devised, and by reason of the controlling cables any controlled mine system is cumbersome and costly. Moreover, it is impracticable to consider installing such a system at a greater distance than say 10 miles from a shore station, and so great a distance as this has rarely been attempted in practice. The application of controlled mining is therefore limited, though there are certain instances where it is preferable to a system of non-controlled mines.

A study of the practice of the various maritime countries would probably show that opinion is divided as to the necessity for controlled mines, though the principal navies had dispensed with it prior to the Great War. England had discarded it, but re-introduced it almost immediately after the outbreak of war as a means of protecting certain East Coast harbours against an invading force. The British mined net became a form of controlled mine, since the firing battery was generally either kept in the attendant vessel or sunk at a distance whence it could be recovered without danger prior to weighing the nets. These are the two main divisions into which mines are divided.

They may be further classified according to whether they are fired by contact with a vessel or otherwise, in which latter case they are known as non-contact mines. The contact mine, of which there are many types, is the better known ; on the ship striking the mine the latter at once explodes if it is a non-controlled mine, while if on the other hand it is a controlled mine it will fire only if the minefield has previously been set at " active " from the control station. Of all contact-firing gears there is none more efficient than the Herz Horn, and this device is the only known mine-firing gear that fully meets the requirements of being both highly sensitive and durable.

Non-contact mines have to be fired either by hand or automatically on the approach of a vessel. The oldest known type is the observation mine, and is a controlled mine. In this case the observer, by means of a specially designed table can follow the movement of any vessel he can see by means of a pointer. This pointer is of metal, and if it touches one of the strips on the table representing the lines of mines, then if that line has been set to fire it will be fired. This is a very old system, dating back to the American Civil War. The increasing efficiency and range of modern guns long ago rendered it practically useless as a means of defence for most situations, but, as already indicated, it was revived by the British Admiralty and employed for the defence of otherwise unarmed, or lightly armed, ports, which might have become the objective in an invasion raid. Clearly such a system is ineffective against a submerged submarine and could not have helped for instance in the defence of the Dardanelles.

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If the eye cannot be used for detection, then a non-contact mine needs an automatic "observer" which will either fire the mine automatically or will tell a human observer that he should fire by pressing a key. The only developments on these lines have been for application to mines intended for use against submarines. Any such "observer" must clearly depend upon some physical property of the submarine.

Type of Anti-Submarine Non-Contact Mines.

To fire a mine of any sort there must be provided, at the desired moment, a sufficient supply of energy in one form or another to operate the firing device. In the case of a contact mine, this is provided by the momentum of the approaching vessel and the resistance offered by the mine to any movement. With a contact mine above a certain size this source of energy is ample for the purpose. The principal difficulty in the development of non-contact mines is to make use of what is, with one exception, an inadequate source of energy for the purpose.

Non-contact mines may be divided into two categories:

(*a*) Those in which there is an antenna or some other connection from the mine with which contact has to be made.
(*b*) Those in which there is no contact of any sort between the vessel and any part of the mine or connection to the mine.

The antenna type may be successfully developed by the application of the principle employed by the American Mining Service in the 60,000 mines laid by them in the Northern Barrage. The source of energy is electrical, and results upon the contact of the steel hull of a vessel with the copper of the antenna, and it is possible to extend the antenna above and below the mine. The rubbing of a steel or iron object against the antenna in sea water results in the current flow required to operate a relay which serves to close the firing circuit of the mine. The antenna type of mine is from one point of view a contact mine, but it should be considered, from the tactical point of view, as a non-contact mine, since the explosive charge itself may be at a considerable distance from the vessel that operates it.

To operate the other class of non-contact mines, in which there is no contact of any sort between ship and mine, there are a number of sources of energy available, but in every case the quantity is so small that the development of a really practical mine has, for the present at least, been concluded to be impossible.

The most important of these sources of energy are as follows:—

(1) Every steel vessel is of magnetic material and can therefore be caused to move a suitably designed magnetic system within a certain range. Such movement of the system can be caused to close an electrical circuit and so to fire a mine.
(2) For a similar reason, every steel vessel passing within a certain range of a suitably disposed coil, or coils, of insulated wire, will induce a current in those coils.
(3) Every vessel propelled by machinery radiates a complex system of vibrations, and within a certain range of the vessel these vibrations can be caused to operate a suitable device.

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Several attempts have been made to develop mines on each of these three principles. A ground mine built of non-magnetic material has been evolved containing a magnetic system approximately five times as sensitive as the most sensitive mariner's compass card. A moored mine has been evolved containing a delicate receiver capable of operating to the vibrations of passing vessels. But the induction method, in which coils of wire are wrapped round the shell of a moored mine and connected to a sensitive recorder failed because the energy available was too minute to be utilisable. Both the magnetic and the vibrational mine achieved what might be called laboratory successes. They never became successful mines. The magnetic mine suffered from the inherent defect that being a ground mine its useful tactical application was extremely limited. The vibrational mine suffered from the vital defect that the distance at which it operated depended entirely upon the behaviour of the vessel it was intended to attack. Both must contain exceedingly delicate instruments, difficult of construction and of calibration, and of very doubtful durability in a mine. Both are exceedingly sensitive to the effects of explosions of neighbouring mines and need the addition of intricate mechanisms to prevent unwanted explosions.

Now if all these practical disadvantages are considered and set against the very small tactical advantage to be gained from the use of such mines, it will be evident why their further development is unnecessary. They cannot be considered practicable in the present state of scientific knowledge because the utilisation of such minute sources of energy for the firing of a mine involves the use of mechanism which, in a mine, cannot be considered reliable. It is not, however, that this failure of a development of the Great War is important. It would be important only if non-contact mines of that type could create new and important tactical uses.

The tactical purpose of non-contact mines is to increase the probability factor of a minefield, and it has to be remembered that for a given quantity of explosive, the greater the probability factor is made the less becomes the explosive efficiency. That is a point it is most important to consider. The need to increase probability occurs mainly in minefields laid against submarines, where the small size and draught of these vessels combined with their ability to submerge, permits only of a relatively low probability for a given number of mines. Where submarines on the surface only have to be considered it is unquestionably best to obtain the desired probability by using a sufficient number of simple contact mines. Where a minefield is planned against submerged submarines, then in many circumstances the antenna type, previously referred to, may be successfully used, but this is the only type of non-contact mine that, in the present state of scientific development, is likely to give any prospect of success.

Buoyant, Drifting and Ground Mines.

The further classification of mines is according to their position in the sea; thus a mine may be moored, drifting, or resting on the

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bottom, when it is known as a ground mine. The ground mine is of use only in very shallow water, and even in only seven fathoms of water a ground mine with half a ton of explosive might not be fatal to a submarine on the surface. Moreover, a ground mine, unless placed to catch a submarine resting on the bottom needs to have a non-contact firing device. It needs, in fact, an observer, and this, as already indicated, is far from being a simple matter. Ground mines therefore are seldom likely to be applicable except in certain rivers and special localities.

Drifting mines are only likely to be useful in river warfare ; they were used by the Turks on the Euphrates and in the Dardanelles (where the current is always in the same direction), and also by the Bolsheviks against the Allies in Northern Russia. In the open sea it is very doubtful if they can ever be successfully used.

There remains the moored buoyant mine, which is the most adaptable type and the type most commonly employed both in controlled and non-controlled mining.

That ends the usual classification of mines, and of all the many possible types there is one, viz. the non-controlled buoyant moored mine with contact firing gear, that is vastly more important than all the others, and with which nearly every mining operation can be performed. It is the only type of mine for the open sea, and it can also be used close inshore for defensive purposes. It represents the mine in its simplest form, and it has only one defect, which is that it does not distinguish between friend and foe as the controlled mine can be made to do subject to certain conditions. In earlier days this was generally set out as a serious objection to the type, but nowadays it is accepted that it needs only careful organisation and planning to use this type of mine even close to harbours and channels. Germany, who has very carefully studied the art of mining, and whose achievements in this art are to be respected, practically used no other type.

Mined Nets.

There remains a rather special form of mining in which mines are attached to nets, and the latter are moored or allowed to drift from an attendant vessel. The whole project is naturally a means of dealing with submerged submarines, and has no other tactical purpose. The nets cannot be towed nor can they be allowed to drift by themselves, for the technical reason that they would soon " bunch " and become entangled. When moored their tactical purpose is precisely that of the moored mine, and they are invisible. When drifting, the attendant vessel and the floats are visible, and though the latter need not be conspicuous it is doubtful if any such arrangement will trap an experienced submarine, so that the only evident tactical purpose of such a system is to form a temporary barrier. It is extremely unlikely to do more.

It is always claimed for any mined net system that fewer mines are needed to protect a given area than with single mines, and that such a system is, therefore, economical. With a few exceptions that is only true on paper.

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In practice two vital objections generally arise, viz. :

(*a*) Elaboration of material; and
(*b*) Poor durability.

Elaboration of material means difficulties in producing, in preparing, and in handling, all of which may be serious, though less so than durability. The objections to the mined net are in fact inherent to the system, and they cannot be entirely, or even nearly, overcome by the design, except under extraordinarily favourable under-water conditions.

The Technique of Minefields.

The technique of minefields is a subject in itself requiring a study of conditions not presenting themselves collectively in other phases of warfare. It is necessary, for instance, to consider the effects of the depth of water, the strength of currents, the rise and fall of tide level, and the probable weather conditions. The depth of the mine below the surface must bear a relation to the type of vessel being attacked, the period of durability required for the field, and the possibility of aerial detection. The shape of the field must take into consideration whether it is in enemy waters or in home waters where sweeping must ultimately be carried out by the sweepers of the laying side. The probability of a vessel striking a mine must be approximately calculated. These, and other considerations, do not offer any particular difficulty, but they need to be studied in the process of formulating a mining policy. Such a study will show that real difficulties are rare and that there are few localities where the conditions are so difficult as to render mining impossible.

Classification of Minefields.

A study of mining operations carried out in the war of 1914–18 and in previous wars enables a classification of minefields to be made under the following headings :—

Barrages.
Mined Areas.
Independent Minefields.

The following definitions and examples are suggested :—

A barrage is a series of lines of mines laid with the object of preventing the passage of enemy vessels. Generally, a barrage will be known to the enemy, and it will essentially be situated in waters where the laying side has the mastery and can prevent any prolonged attack upon it. It may consist of both shallow and deep fields.

The following examples of barrages are shown on the chart (facing p. 122) : The Folkestone-Grisnez Barrage of 1918 ; the Northern Barrage ; the British East Coast Barrage.

Mined Areas.

A mined area is an area of any size, accurately marked off, which it is intended to keep filled with mines indefinitely. Its object is

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to harass an enemy, and because of its nature it will be situated where the enemy has at least some freedom of movement, and possibly almost complete mastery of the waters.

The following examples of mined areas are shown on the chart (facing p. 122): The Bight Minefields laid by the British; the Semi-circular Mined Area round the Firth of Forth laid by German submarines.

Such a mined area as that represented by the Bight minefields may become the scene of serious conflicts of naval forces, and may indeed have such conflicts as its ultimate object, where one side is employing its forces in maintaining the minefields and the other side in clearing them.

Independent Minefields.

An independent minefield is a minefield laid with a specific and probably a temporary object. Under this heading come a number of small mining operations as, for instance, the mining of British ports and channels by German submarines. On the British side, minefields, sometimes large and sometimes small, have been laid on the receipt of information indicating that certain vessels are temporarily using certain waters and will pass through them on a certain day. Both these cases are distinct from the mined area in that such fields either cannot have, or are not expected to have, any prolonged value, and that it is either impossible or of no utility to maintain them.

Types of Minefields.

Perhaps it will be simplest to indicate the types of minefields that are possible by describing a number of the minefields laid by the belligerents in the war of 1914–18. In that war every conceivable use of mines was considered and very many put into practice. At the climax of the naval war in the latter half of 1917 and the first half of 1918 it will be remembered that Germany was making a desperate attack upon British sea-borne commerce with her submarines, while British naval resources were mainly concentrated upon a counter attack to this well-nigh successful attempt. It follows therefore that during this period, the period of the most intense mining operations, Germany's principal objective with the mine was sea-borne commerce, and that of British mining operations was the German submarine.

The chart (facing p. 122) shows a number of the minefields to which reference is made in the following pages.

The Bight Minefields (British).

The earlier policy in the Bight had been to lay mines across it as thickly as possible, and to reinforce them often in order to obtain a barrier. Early in 1918 a new policy was adopted under which it was decided to keep certain well-defined areas and routes open to our own vessels while laying as many mines as possible elsewhere, particularly in what were believed to be enemy-swept channels.

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These operations largely resolved themselves into an attack upon enemy sweeping forces and the light forces protecting them, and from their commencement greatly harassed the German Navy. At one time practically the whole of the German light forces were occupied in endeavouring to keep clear sufficient passages to pass their submarines in and out. At least one hundred German vessels belonging to the naval forces were lost in these fields, and finally the bulk of German submarines avoided the Bight and took to the passage through the Cattegat via the Kiel Canal.

This policy was carried out with the standard contact mine (Herz Horn), of which 22,000 were laid in this area by the 20th Destroyer Flotilla. Moreover, in addition to mining in accordance with the set policy of 1918, many minefields were laid in this area in the endeavour to trap vessels by whom a sortie was reported to be intended. These particulars are not available, but it is after all the main policy decided upon in the winter of 1917 that is of importance, namely, to harass the German submarines, sweeping forces, and light naval forces by constant mining of the swept channels.

On the chart is shown the line of lightships and light buoys laid by the Dutch on the western extremity of the area proclaimed by the British for the purpose of guiding traffic to their ports. It is interesting to note that in this area a number of mines were laid by the Dutch within their territorial waters in order to prevent the passage of any belligerents, such areas always being notified prior to being mined. To the British submarine minelayers were allotted areas close in to the German coasts.

Between this line of lightships and light buoys and the area of the protective minefields round Heligoland the chart shows an area where considerable mining activity was carried on by both sides, the British laying thousands of mines in the German channels, and the Germans occasionally laying fields as a counter-measure.

As the chart indicates, the area immediately to the south was the scene of mining operations of the most intensive kind.

The Folkestone-Grisnez Barrage of 1917–18.

The Folkestone-Grisnez Barrage, commenced late in 1917 and completed early in 1918, was a distinct operation in itself with the sole object of preventing the passage of German submarines from the Flanders bases to the English Channel and Atlantic via the Straits of Dover. Its object was fully achieved prior to its completion. Attempts to close the Straits of Dover with other types of mines, with nets, mined nets, patrols, and so on, which had been made continuously since the outbreak of war had all failed and the resultant situation had become very serious.

The Folkestone-Grisnez Barrage consisted of 9,500 Herz Horn mines in 20 to 25 lines, spaced 150 feet apart, and laid at depths of from 30 feet below L.W.O.S. to within 12 feet of the bottom. All the mines were deep, that is to say, below the draught of ordinary vessels, and the area was thus not dangerous to peaceful traffic. Moreover, adequate arrangements were made by the British and

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French authorities to escort any craft wishing to proceed across the mined area, and it was thus not necessary, under International Law, to announce the area as being mined.

As has been pointed out elsewhere in these notes it is necessary to patrol any deep minefield continuously in order to cause submarines to dive, and this necessity, soon realised as the barrage grew, resulted in a number of torpedo-proof vessels being moored to the eastward and westward of the barrage and equipped with searchlights and a gun. In addition the patrol vessels, which were mostly armed trawlers, were provided with flares so that it became almost impossible for a submarine to pass over the minefield unobserved even at night. In a short space of time nine submarines were lost in the minefields, and German attempts to reach the English Channel by this route ceased altogether. In planning the field use was made of the Varne Shoals so as to limit the number of mines required to stretch from shore to shore. A surveying vessel was continuously employed in plotting the positions of the lines and in laying the necessary mark buoys.

The East Coast Barrage.

In 1918, owing to the success of the Folkestone-Grisnez Barrage in preventing the egress of German submarines to the westward via the English Channel, there began to be felt an increased activity in the attacks of German submarines within the North Sea. Naturally enough these attacks were directed against the concentration points of the merchant convoys about to cross the North Sea. A very important area for this purpose was in the neighbourhood of Newcastle-upon-Tyne, and as an additional protection to the assembling merchantmen the East Coast Barrage was planned. This was to have consisted of 9,000 mines laid in three deep and three shallow lines off the coast of Yorkshire and Durham. It was commenced in August 1918, but was not completed by the date of Armistice.

The Northern Barrage.

This vast mining enterprise was an attempt to close the exit of German submarines by the north-about route and thus to reduce their attacks upon ocean-carried commerce and the transport of troops. That so huge a mine barrier could be maintained so effective that no submarine could get through was not expected, but the estimated probability was that, at the least, the attempted passage of submarines would be confined to certain areas and that opportunities would be presented of concentrating attacks upon them. The position of the barrage was a matter of much discussion between the British and American naval authorities, who, between them, were to undertake the work. Many points had to be considered, such as the necessity of giving freedom of movement to the Grand Fleet, keeping open the traffic routes and at the same time placing the barrage where it could be erected in the shortest time with the

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least interference. Finally the barrage was placed as shown in the chart (facing p. 122), and in 1918 the areas A and C were notified as being dangerous.

Laying commenced in May and was executed by a force of 10 American minelayers who laid 56,571 mines, and 5 British minelayers who laid 13,546. The central area A was allotted to the American force, and the areas B and C to the British force, although area C (to the east) was eventually partly mined by the American layers. It had been contemplated to lay only deep mines in areas B and C and to patrol these areas, but to patrol area C without a base in Norway was judged impossible before laying commenced, and ultimately it was decided to mine from the surface downwards from Norwegian territorial waters to within 10 miles of the Shetlands. This policy was put into operation, but was only about two-thirds completed by the time the Armistice appeared imminent, nearly 70,000 mines being laid out of a total of 120,000.

The barrage produced at least a part of the desired effect, and German submarines mostly confined their attempts to pass through Norwegian territorial waters or through area B where some were undoubtedly lost. As regards Norwegian waters, protests from the Allies had their effect in due course, and in August 1918, Norway announced her intention of mining her own waters and proclaimed the area to the southward of the south-eastern corner of the barrage as being dangerous. This barrage must be regarded as a colossal attempt to solve the submarine problem, and as it was never completed a comprehensive judgment of it is hardly possible. However, as indicated, it showed every sign of success. A number of submarines were lost in it, and in rendering vastly more difficult the efforts of German submarines in their war on the Allies' communications it undoubtedly had an important effect upon the wavering activities of the German naval forces.

Minelaying by German Raiders.

The minelaying activities of the German raiders Moewe and Wolf are of interest in showing what a determined attempt of this nature can do.

The Moewe on her way out to the ocean laid a large field of some 250 mines on New Year's Day, 1916, to the west of the Orkneys. Commencing about 10 miles from the Orkneys it ran in zigzags at 3 to 7 miles from the mainland. The loss of the King Edward VII and of two neutral steamers a few days later gave the first indication of it.

The raider Wolf put to sea on November 30, 1916, carrying in addition to her armament and guns some 450 mines. Her voyage lasted fifteen months and her mines were found all over the globe without its being known by whom they had been laid until the beginning of 1918. She laid mines off Capetown, Cape Agulhas, Colombo, Cape Comorin (Ceylon), Aden, Bombay, between Melbourne and Sydney, between the North and South Islands of New Zealand, and a last effort of 110 mines off the Andaman Islands in September

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1917. In all she accounted for fifteen vessels with her mines alone, and caused immense consternation by the unexpectedness of an attack of this nature.

Operations by German Surface Vessels.

German surface minelayers, as distinct from the efforts of the raiders Moewe and Wolf, were fairly active in British waters from the outbreak of the war until just after the middle of 1915. Then their efforts ceased and were presumably confined to their own waters where many protective minefields were laid. The furthest afield that any one of them ventured was to the north of Ireland, where a field of 200 mines off Tory Island accounted for the battleship Audacious and several other vessels.

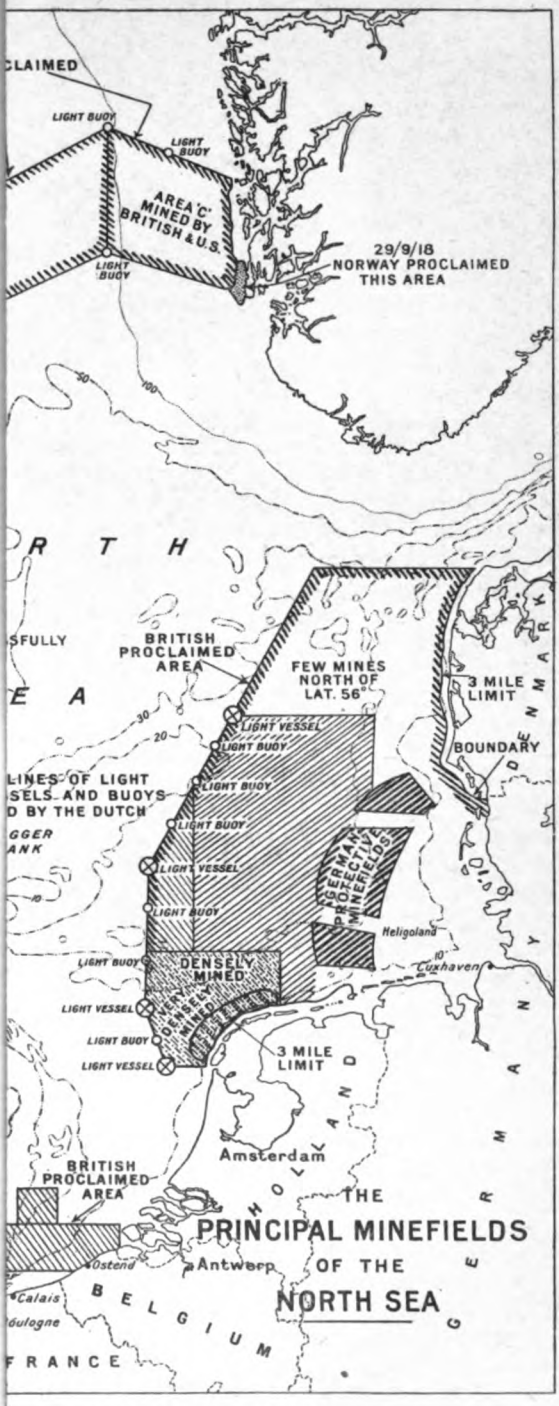
In 1914 and 1915 mines were also laid off Scarborough, twice off the Humber, the second being a large field of 360 mines on April 4, 1915, a large field of 480 mines on the eastern Dogger Banks, and finally, a field of 380 mines laid in the Moray Firth and aimed at the Grand Fleet on August 7, 1915. In the latter field were lost the destroyer Lynx and a sloop had her bows blown off, thus the field had but little effect compared with the earlier ones when the British minesweeping forces were less well organised. It is interesting to note in the case of the latter field that mines were only swept to clear a passage of 10 miles from the shore, leaving the remainder to guard against a similar attack.

Minelaying by German and British Submarines.

Compared to the immense losses caused to the British and Allied commerce forces, not to mention neutrals, by German submarines minelaying, the effects of minelaying by German surface minelayers were relatively unimportant. Generally the German submarines concentrated their minelaying efforts in the neighbourhood of Allied ports, placing their mines in small groups of seven or nine as close in to the approaches of the ports as they dared. This proved, from their point of view, a thoroughly effective policy, and in addition to the immense material damage they achieved, they caused serious dislocation of traffic and delays in the movements of Allied vessels.

In addition, in 1918, definite mining attacks were directed, firstly against the Dutch convoys by minefields laid in the neighbourhood of Ymuiden and the Maas; secondly, against the Scandinavian convoys; and, lastly, against British naval forces by means of an attempted mined area taking the form of a semicircle of about 45 miles radius round the Firth of Forth. Of these only the former met with appreciable success and proved a constant source of trouble since the British sweeping forces were liable to sudden attacks from the Flanders Coast. In the two latter cases the greatly improved methods by this time employed by the British sweepers, and assisted by the efficiency of the paravane, enabled these attacks to be met with scarcely any actual loss, though naturally at the expense of very considerable inconvenience and the utilisation of large forces.

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IELDS DURING THE LATE WAR.

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In all, German submarines laid some 11,000 mines. In 1916 they laid 195 distinct fields, chiefly off the East Coast of England, and in 1917 as many as 536 and the area had by this time extended right round the British Isles and the northern coast of France.

Minelaying by British submarines was naturally confined to the relatively small area off the German coast in the North Sea that could not be reached by surface minelayers. In all they laid some 1,500 mines and inflicted very considerable losses upon the enemy.

A. L. GWYNNE,
Commander, C.B., R.N.

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CHAPTER IX.

Contemporary Naval Literature.

More than a dozen naval authors, and many dozens of naval books, associate themselves with the mere words naval literature. Since the subject was last reviewed in "Brassey's Naval and Shipping Annual," Admirals Bacon and Harper and Mr. Winston Churchill have added to the volume of Jutland literature. Admirals Richmond, Custance, and Ballard, and Professor Callender have written several closely reasoned studies on what may be called the philosophy of naval history; Mr. Brian Tunstall has recently won a recognised position amongst naval historians by his book upon the Minorca campaign and the court-martial of Admiral Byng. These are names and works which occur automatically in any review of naval literature.

There are many others, almost as familiar. Commander Dorling, the author of "Pincher Martin" and other works of fiction, has broken fresh ground in the field of historical reminiscence. Mr. William Senior and Mr. Lockhart have done the same. Surgeon Rear-Admiral Jeans, another author of boys' books, has joined the company of writers of naval reminiscences, but he is only an outstanding figure in a group which includes Admiral Chambers, Admiral Boyle Somerville, Admiral Sir Herbert King-Hall, Lieut.-Colonel W. P. Drury, Paymaster Rear-Admiral Martin, and Paymaster Captain Willis. Memories of lower-deck service have been recounted by Lieut.-Commander H. D. Capper, Mr. Patrick Ryley, and Mr. Sam Noble. The researches of Mr. Philip Gosse have started a revival in pirate literature. Mr. Archibald Hurd has dealt with the same topic, and Professor Cooper Prichard with buccaneers.

Even this list of authors is incomplete: Mr. Manwaring's learned edition of an old classic in naval literature—"Teonge's Diary"—has been followed by Captain Alfred Dewar's edition of "Uring's Voyages"; and by re-editions of Woodes Rogers, Commodore Walker's, and Captain Shelvocke's narrations. If naval writers can be found with sufficient scholarship to maintain the standard set by Mr. Manwaring and Captain Dewar, the series to which these books belong will be a long and interesting one. A place of its own is taken by that fascinating work, "The Sea in English Literature," by Anne Treneer: a minute survey of English literature, within her chosen period, so far as it deals with the sea and seafaring. Any of these books would justify a critical review as long as the present article; several of them a far longer one. Selection and discrimination are tasks preliminary to any survey of contemporary naval literature.

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It requires no great penetration of mind to understand that the focussing points of naval literature have changed during the last twelve years. The war was preceded by half a century of peace, in which the problems of naval defence were computations of the two and then of the one-power standard. During that fifty years the discussion of naval problems was maintained at an extraordinarily high level by a generation of naval publicists, who were perhaps the acutest and the most public-spirited technical journalists that any country has ever produced. Every naval problem of their day was calmly and adequately presented to the British public. Foreign building programmes, the yearly manœuvres of the British Fleet, questions of naval education and recruiting, were all discussed in the columns of the leading papers and in well-documented pamphlets upon problems of naval defence.

But the naval literature of those days was not closely reasoned and well informed merely because naval publicists were exceptionally competent. Their subject was compact; its essential data was a circumstance which never altered. A foreign navy, whose combatant strength had been calculated to the last three-pounder gun, was concentrated in bases and arsenals a few hours' steaming from the British islands. It mattered little that the German Fleet succeeded the French in the position of principal naval rival; the task of the naval publicist was to comment upon the resulting position in the language of warning or of confidence. The subject had its half-lights and its uncertainties, which were productive of many a well-argued controversy. But it was a concise subject; and it received concise treatment.

Modern naval problems are less sharply defined; and it is, in consequence, far more difficult to present them to the public in a manner which makes them topics of burning interest. The growth of navies is no longer determined solely by international rivalries; naval development is now subject to the public law of civilised countries. The old problems of security, the old tactical questions survive; but they survive in an international situation which is vague, incoherent and tentative; the problems have lost their sharpness of outline.

Again, oceans, not seas or channels, separate Great Britain from her potential rivals; the old method of computing security solely by ships and guns has gone. Some new method which takes far less calculable things into consideration is obviously necessary. It is possibly because of all this that naval literature has burst its old boundary posts, and now embraces such a wide range of subjects, many of which are purely retrospective. But it cannot for a moment be said that British naval publicism has reached a period of decline and fall. Quite the contrary; vague and indefinite as many of our naval problems may be, writers have been found who are well qualified to present those problems to the public in the old lucid and forceful way.

Mr. Hector Bywater's book, "Navies and Nations," may without exaggeration be called a standard work in the new manner. The author realised that his subject could not be presented in the old,

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strictly professional style. The condition of the world's navies after the Washington Conference was the principal subject-matter of the book, and the author introduced his subject with an impressive analysis of the international position which preceded the Washington Conference. He described the naval rivalry, with which the great Powers were threatened in 1922, by a long and exhaustive analysis of the speeches uttered by the most authoritative statesmen of the day. So many of these utterances were in the nature of permanent definitions of national policy that the book has more than a mere topical value. But Mr. Bywater's great achievement was that he succeeded in showing how many points of naval inequality remain after navies have been equalised by international agreements. The old calculations, which reduced questions of national security to tables of guns and armour, have still to be made; the equations may be longer, the variables more numerous, these none the less are the quantities which make the equation soluble.

Mr. Bywater's book served a very good purpose: it showed, at once, that naval publicism must henceforward concern itself with matters which the older generation of writers had carefully excluded from their subject. The time when the nations of Europe disarm may be, in fact probably is, still fairly distant; but naval armaments having been partly settled by international agreements, will tend to be more and more controlled by them. It is not only the words and texts of these international agreements which have to be included in the subject-matter of naval publicism. The political forces, the national sentiments that act alternately as binding or dissolvent forces to the public law which, in some degree, regulates the old naval rules of competition, are the essential data of any competent naval literature.

Everybody will remember how keenly the public of Great Britain followed what was popularly called the battleship and submarine controversy. The greatest daily paper in the kingdom promised that if any person who had anything relevant to say would express his opinions in a letter, then his letter would be published. Contributions were sent from every corner of Great Britain. This intense interest was indicative of the concern that Englishmen do feel in questions of national defence if those questions are presented to them succinctly and cogently.

The controversy has outlived its first passionate period, but it survives none the less. The ordinary public know perfectly well that progress in aeronautical design and engineering has raised a new problem of national security; and several very well-informed writers have presented that problem to them with singular force. Mr. Spanner—the author of "Armaments and the Non-Combatant"—contends that the basic principles of warship design should be revised; as at present constructed, surface warships are unsuited to maritime warfare; aeronautic progress has made them useless. It is an extreme theory; but at least it is supported by facts obtained by a most careful study of all available literature on the naval war. The weakness of Mr. Spanner's book is that he fails throughout to realise that a naval armament exists for the performance of certain

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strategic duties. He proves its vulnerability by an impressive collection of facts; but he does not show that the vast complex of naval duties which strategists call the control of maritime communications cannot be performed by naval armaments as they are at present constructed. He only proves that the satisfactory performance of those duties is becoming increasingly obstructed by difficulties. A more conservative and more persuasive review of the balance of air and sea power has been made by Neon, which is obviously the *nom de plume* of a naval officer of high technical knowledge.

Admiral Richmond stands pre-eminent amongst the philosophical writers upon naval affairs. His recent book, "National Policy and Naval Strength," has a logical consistency which is not usually found in a collection of essays. Admiral Richmond's main purpose is to show the permanent unchanging character of certain problems of grand strategy. The facts which support or illustrate his arguments are mainly historical; but his book is by no means purely retrospective. To Admiral Richmond, it is more than a mere chance which has placed Great Britain at the head of so many alliances and combinations of European states. The doctrine of the balance of power does not entirely explain it, far less any inherent sympathy for weaker nations or love of political freedom. The real explanation is that a naval armament, however powerful, will only bring an opponent to terms in quite exceptional cases. Some degree of military strength is a necessary complement to maritime power; and the history of our alliances is little but a history of the search which British statesmen have made for this complementary force during four centuries.

This is an interpretation of British history which establishes a method for reflecting upon contemporary events; and it so happens that the appearance of Admiral Richmond's book synchronised with the publication of the most important contribution to the study of British history that has ever appeared from a British printing press. The collection of diplomatic documents edited by Messrs. Gooch and Temperly is not, properly speaking, a naval work. But it is a record of political history and diplomatic action of which British strength at sea was the driving force. No serious student of naval affairs could possibly allow himself to remain ignorant of the contents of this collection; and, as we say, Admiral Richmond suggests a method of interpretation. Are the long bargainings between Lord Lansdowne and Monsieur Delcassé, the argument and counter-argument about the most trifling details, to be regarded as manifestations of a traditional policy? Possibly not; but anybody who has read Admiral Richmond must freely admit that his method of reading British history at least establishes a critical principle, or a rule of judgment upon contemporary policy, and serves as a reminder that diplomatic controversies in which the sea is never mentioned are none the less the first derivatives of our maritime power.

Although the form and character of Mr. H. W. Wilson's work differentiate it sharply from Admiral Richmond's, Mr. Wilson none the less belongs to the historical school of naval writers. His work,

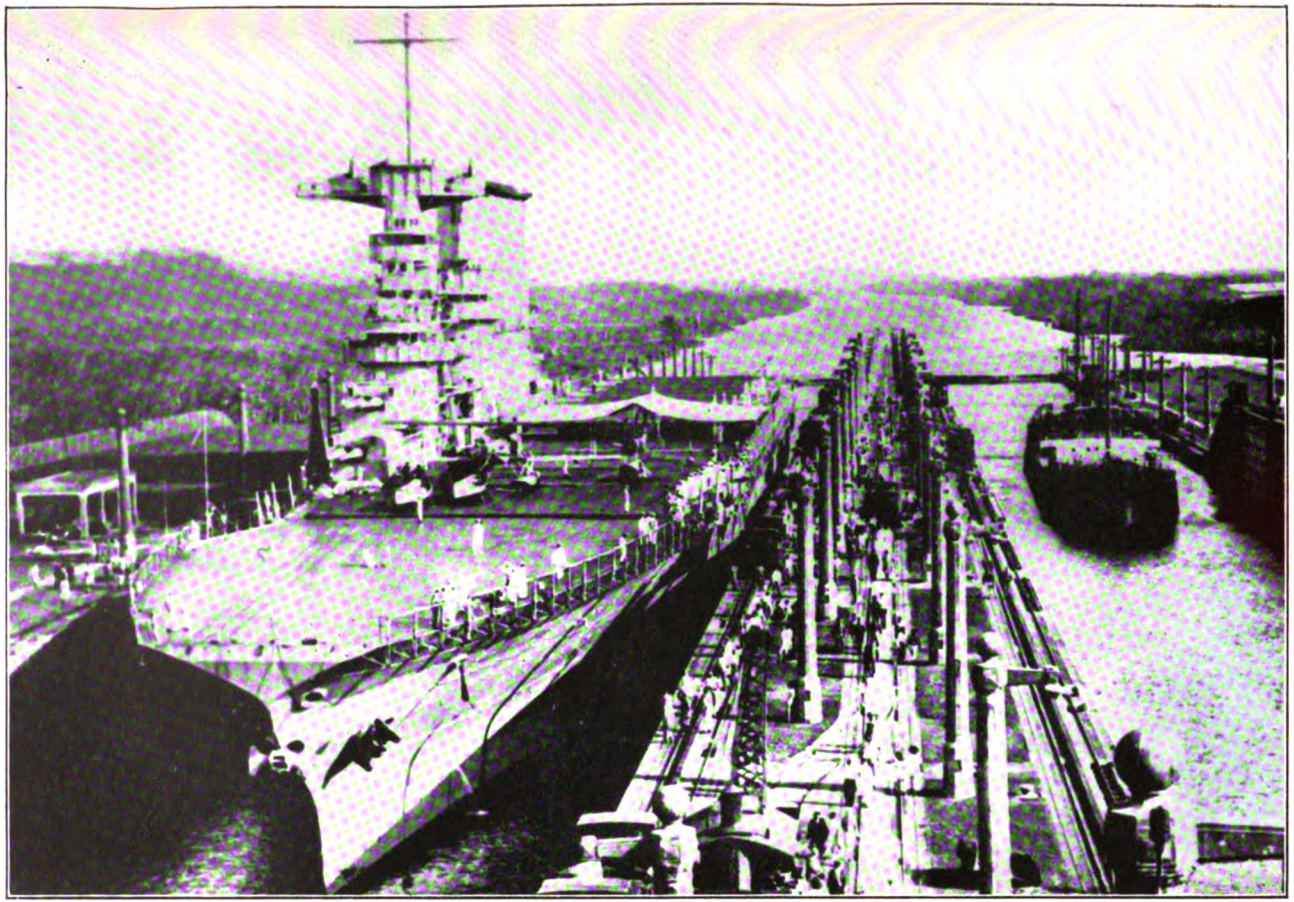
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"Battleships in Action,' is above all things a piece of scholarly research into the evolution of modern naval armaments. His chapters upon the Great War, though closely documented, are a sort of reasoned appendix to the main subject. Mr. Wilson's historical method is strictly scientific; he leaves the records of mechanical invention alone. Modern naval history is to him an investigation of those naval actions which have been decided by modern weapons and their immediate predecessors. Naval tactics are corollaries to gun ranges, armoured belts, and the penetrating power of artillery; naval strategy, a practical method for bringing two combatant fleets to action at the earliest possible moment. But to say that Mr. Wilson ignores the half-lights of his subject is to misunderstand his method of treating it. He ignores nothing; the few remarks which he chooses to make upon politics and their influence upon sea warfare show that he has thoroughly explored these regions of his subject. His concentration upon the known facts of actions fought at sea is the result of deliberate selection, of a desire that there shall be nothing vague or indefinite in his presentation of what he considers to be the really important facts of sea warfare.

There is a connection between Mr. Wilson's method of presenting historical facts and Admiral Custance's method of reasoning from them. Both writers show the same severity towards anything that they regard as irrelevant. The similarity is, however, of method only. Admiral Custance's work, "A Study of War," is a powerfully reasoned essay from the facts of sea and land warfare. The Peloponesian war is as relevant to his argument as the German submarine campaign. Nor does he restrict his survey to sea warfare. A whole chapter is devoted to the campaigns of the French revolutionary armies. Admiral Custance's purpose was to relate the purely political objects for which statesmen go to war to the purely military objects which are the concern of generals in the field or of commanders afloat. He admits that if the armed forces of one country utterly overthrow the armed forces of another, the political objects of the war are automatically attainable by the victorious party. This, however, is an extreme case; circumstances create intermediate ones, and Admiral Custance has shown with exceptional force and power how an intermediate military position, in which neither side is absolutely dominant, may suffice to secure a political object.

Captain James's book, "The Navy in Adversity," gave him a recognised position amongst contemporary naval historians. It is the naval history of the War of American Independence. The continental coalition, which was formed after the colonial struggle had fairly begun, equipped fleets which were considerably more numerous, and, on paper, more powerful than the British. These fleets opened communications between Europe and the revolted colonies, and enabled the continental powers to carry armies to America which established colonial independence. Captain James is throughout rather more impressed by the chances which the French Fleet threw away, by reason of its cautious leadership, than with the large strategical objects that it actually attained; but he is in no sense a historian whose patriotism vitiates his scientific method.

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(*Photograph by Topical Press Agency.*)

U.S. AIRCRAFT-CARRIER SARATOGA, 33,000 TONS.

(*On Passage through the Panama Canal.*)

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His conclusions, when he draws them, are the conclusions of a highly informed mind, which has examined the facts of his subject like planes and solids. His conviction was that such amelioration as the British Fleet was able to produce in a strategical situation of extraordinary difficulty was produced simply and solely by hard fighting. It was natural that he should be a little severe upon such leaders as de Guichen and de Grasse, and pay more attention to what they failed to do in battle, than to what they achieved in war. None the less Captain James's book is an extremely valuable contribution to naval history. Naval officers are inclined to read the history of their service more for moral inspiration than for rules of practical conduct; "The Navy in Adversity," which justifies the traditional naval spirit by a scientific investigation of historical facts, might well be made an educational handbook.

Captain James's book is scholarly, but it is essentially the book of a professional man. Mr. James Williamson's "Life of Sir John Hawkins" is a work of pure scholarship. The author has searched for every fact that bears upon his subject, for every detail that illustrates it, and has assembled his researches in a truly masterly volume. He has for ever shattered the vulgar error that nothing remains to be discovered about our sixteenth century seamen. The foundations of this admirable book were laid some years ago, when Mr. Williamson discovered a new account of Hawkins' third slaving voyage in the Cotton MSS. of the British Museum. The manuscript had been much damaged by fire and was extremely difficult to edit None the less Mr. Williamson persevered, and the Institute of Historical Research awarded the Corbett Naval History prize to Mr. Williamson's edition and commentary. The author then expanded his first essay into a general life of Hawkins. He extracted a great deal of information from the local records at Plymouth, and he has shown how much naval history is to be found in our legal archives. Nobody, before Mr. Williamson, has thought fit to trace the course of naval affairs from the records of the High Court of Admiralty; and the results yielded are surprising. The information extracted is not by any means purely legal; it throws a shaft of light upon the diplomatic controversies that were for ever arising out of maritime enterprise in the Tudor period. In addition to this Mr. Williamson has made a valuable contribution to the administrative history of the time. Hawkins has for long been known as a sea adventurer; Mr. Williamson presents him as an able First Lord and controller.

Mr. Carr Laughton is to be congratulated on having found a new subject in naval archæology and having exhausted it. Nobody will ever dare to write another word about ships' figure heads and sterns. Everything that can possibly be discovered about the outer decoration of old ships has been collected into his magnificent volume. Ship decoration is as old as ship building, thousands of pagan superstitions, or decorative fashions in domestic architecture have influenced it. Mr. Carr Laughton has not been content merely to follow the history of the British ship decorator's art. The ships of all the great maritime nations are included in his analysis. This

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book owes a good deal, as so many others do recently, to the collection of maritime prints and paintings formed by Mr. A. G. H. Macpherson, and now acquired for the nation.

The title of Captain James's book, "The Navy in Adversity," might well have been printed on the front page of Mr. Powley's monograph upon the Navy during the revolution of 1688. The leaders and men of a combatant force were never in greater perplexity than the Earl of Dartmouth and his officers during the months of October and November, 1688. The fleet put to sea, determined to do its duty. But within a few weeks no serving officer could say with any certainty what his duty actually was. He was not qualified to decide which was the Government in law, and was quite uncertain as to which was the Government in fact. A monograph on such a subject is of perpetual interest. The obligations which, taken together, maintain discipline and a sense of corporate loyalty in a naval or military force never have been, and never will be, catalogued and defined. And the influences which dissolve military discipline will never be analysed more successfully than discipline itself. Certain dangers to discipline are known and provided against; all the dangers to which it is exposed never can be. The interest and practical use of Mr. Powley's book is that it shows that not even a system of trappist seclusion will prevent the infiltration of political passion from the nation at large to its armed forces.

The authors and books expressly mentioned in this brief survey have been selected because they are fairly representative. It is, indeed, impossible to regard naval writers as a literary school. Several occupy, and deserve to occupy, a respected position in contemporary letters, for many a professional writer would be glad to write prose as they do. But whatever position it may hold, naval literature is above all things the literature of the retired seaman; it enjoys his freedom from the restraints of the naval discipline act, and expresses his enjoyment of intellectual liberty in speculations on the past and future of the service. It is retrospective, analytic and prophetic by turns. No bond of admiration for an author of outstanding merit unites naval writers into a school, with its particular literary preoccupations. In these circumstances abundance is better proof of a healthy growth than symmetry or concentration. A literature which is contributed to by historical and archæological scholars, editors of ancient documents, writers of reminiscences, and publicists, is not threatened with decay.

A. Colquhoun Bell,
Lieut.-Com., R.N.

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CHAPTER X.

Marine Aviation.

The rapid progress of aeronautical science is certainly exerting an ever-increasing influence upon Naval Strategy, and as aircraft Improve in efficiency so new problems arise which call for very serious consideration. It is now recognised that no fleet under modern conditions is complete without an efficient Air Arm and it is more than a remote possibility that the scale of victory might be turned by this unit in any future naval engagement. Thus, since the integrity of the Empire depends upon the freedom of the seas it is essential that Great Britain should spare no effort to keep ahead of other nations in the development of marine aviation.

In this connection it is satisfactory to record that during the past year additions have been made to the Fleet Air Arm and to Coastal Reconnaissance Flying-Boat Flights, while several new types of marine aircraft have been produced. Great Britain holds the Schneider Trophy for high-speed seaplanes, which proves that we can produce the fastest marine aircraft in the world, while our supremacy in the construction of large flying-boats has been shown by several notable long-distance cruises. Thus to-day Great Britain may justly claim to be the premier marine air power.

The Fleet Air Arm.

The Fleet Air Arm is composed of those units of the Royal Air Force which serve afloat with the Fleet in aircraft carriers. This branch of the service is jointly administered by the Admiralty and Air Ministry and a large percentage of the personnel is made up of naval officers and ratings lent to the Air Force for duty with the Fleet. While serving afloat the Fleet Air Arm is subject to naval discipline.

The Fleet Air Arm is sub-divided into Flights; each having special types of machines with which to perform a particular function in Naval Air co-operation. There are four types of Flights as follows: (1) Fleet Fighter Flights; (2) Fleet Reconnaissance Flights; (3) Fleet Spotter Flights; and (4) Fleet Torpedo-Bomber Flights. Aircraft-Carriers in commission are allocated a proportion of each of these flights. Thus a single carrier is equipped to perform every function which might be required from the Fleet Air Arm in war.

The functions and equipment of these Flights may briefly be defined as follows:—

Fleet Fighter Flights are equipped with single-seater aircraft

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armed with machine-guns and capable of high speed together with fast climbing abilities. These Flights are maintained primarily with the object of defending the Fleet against attack by hostile bombers or torpedo 'planes and to drive off or destroy reconnaissance aircraft. It is essential therefore that the aircraft employed for this duty should possess sufficient speed and climb to fly off the deck and engage the enemy at short notice. These Flights may also be required to escort their own Torpedo-Bomber and Reconnaissance Flights and they might even be employed to bomb the flight decks of enemy carriers with small bombs capable of rendering the enemy ships ineffective for flying duties. Fleet Fighter Flights would probably form the basis of local air supremacy during a fleet action. Given machines with the necessary performance and manned by highly skilled pilots, these Flights should be capable of denying the air to enemy aircraft and so rendering it possible for their own reconnaissance and bombing aircraft to wing their way unmolested by enemy fighters. Thus, under modern conditions, efficient Fleet Fighter Flights are one of the first essentials in the equipment of a fleet for war.

Fleet Reconnaissance Flights are equipped with two- or three-seater machines, fitted with machine-guns for self defence and wireless for communication with the Fleet. As their name denotes, they are employed to locate the enemy, and having accomplished this, to keep him under constant supervision. The machines employed by these flights are either fitted with wheel undercarriages for deck flying or with floats for employment as seaplanes.

Fleet Spotter Flights may be equipped with machines similar to those used by reconnaissance flights. Their primary duty is spotting for gun fire and the personnel are specially trained for this work. In the main, however, they are very similar to reconnaissance flights.

Fleet Torpedo-Bomber Flights are equipped with single or two-seater aircraft. These machines carry either a torpedo or an equivalent load of bombs, and they are armed with guns for self-defence. Their duty is aerial offensive action against enemy ships.

In addition to aircraft in carriers, one or two machines, usually fighters, may be carried in capital ships and cruisers. In this case the machines are launched from a catapult gear and are unable to land again on their parent ship. They would probably return to a carrier or, in the case of seaplanes, they might land along-side their parent ship and be hoisted on board.

Deck Flying.

As has been indicated, there are to-day two distinct methods of launching aircraft at sea: the ordinary run off the deck of a carrier, and what may be termed the shoot off by catapult from a fighting ship. While it is possible to land again on the deck of a carrier, this is of course out of the question in the case of a fighting ship.

Naturally aircraft employed for use with the Fleet at sea are advancing in efficiency with increased knowledge of aerodynamics. The main features required for ship aircraft are the ability to rise

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quickly and land slowly, combined with a high performance in the air. Possibly the greatest advance in this direction has been achieved by the perfection of the Handley Page Slotted Wing; with which device it is said to be possible to land an aeroplane while the ship is steaming down wind. With normal wings the ship must steam at full speed into the wind while the aeroplanes are landing.

Naturally the greatest problem associated with deck flying is the operation of machines required to fly with a heavy load; as, for example, torpedo aeroplanes. An excellent indication of the progress which has been made in this direction is the Handley Page "Harrow." This machine is designed as a ship torpedo 'plane or heavy bomber, and it is, of course, fitted with the slotted wing. With full load, *i.e.* 7,300 lb., the machine fitted with a Napier "Lion" engine has a top speed of 136 m.p.h., while it lands with the slots open at 52 m.p.h. This means that if a carrier was steaming at 25 knots into a 20-knot wind, the speed of the machine when it comes down to alight on the deck would be practically exactly the same over the sea as that of the ship. In other words it could drop practically without any forward movement on to the deck. Similarly it could rise from the deck under like conditions when travelling little faster than the ship, or in other words with only a short forward run along the deck.

A new type of torpedo 'plane or heavy bomber has just been put into production for the Fleet Air Arm. This is the Blackburn "Ripon" driven by a Napier "Lion" engine and built by the Blackburn Aeroplane Co., Ltd., of Leeds. This machine is a distinct advance on the Blackburn "Dart," the present service type, as it carries a crew of two, the rear cockpit being occupied by an observer gunner, thus rendering the machine capable of self-defence and independent of escort.

Efficient Fleet Fighters are the best answer to those who predict that aircraft will bomb a battle fleet off the seas, because such machines can obtain air supremacy and rob an enemy of the ability to use his aircraft. Under these circumstances it is some satisfaction to know that the Imperial Japanese Navy, the third Navy in the world, comes to Great Britain for its fleet fighters.

In a recent contest for the adoption of a new type of deck landing fleet fighter by the Imperial Japanese Navy, the Nakajima Aircraft Company's machine, the Gloster "Gambet," designed by the Gloster Aircraft Co., Ltd., of Cheltenham, won and was definitely adopted. This machine is now in production in Japan under licence from the British company. This proves the ability of British aircraft constructors to produce efficient examples of this type of aeroplane which is of such importance to our National safety.

Coast Defence.

An important part which aircraft can play in naval warfare is that of coast defence. Coastal Reconnaissance Flights, as Royal Air Force Units maintained primarily for coast defence are designated, do not under the present organisation form part of the Fleet Air Arm. Thus although these units would be called upon in war

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to perform naval duties, apparently they would not come directly under naval command.

The success of aircraft employed upon coast defence duties would depend upon the closest co-operation between the air and the surface units. This would present obvious difficulties under the existing—and it would appear far from economical—system of separate sea and air commands. For coast defence, aircraft must be regarded as naval vessels operating above the surface just as submarines operating below the surface, and close co-operation in this duty is just as essential as it is between the Fleet Air Arm and the battle fleet. Nevertheless, although the Admiralty has some say in the organisation and administration of the Fleet Air Arm, the equally important but numerically few and, therefore, totally inadequate air units maintained for coast defence are entirely under the control of the Air Ministry; an idiosyncrasy which appears to be incapable of rational explanation.

The first essential to the successful defence of a coast line is—as indeed in all military operations—early and accurate information regarding enemy movements. The first possible source of such information is, of course, the secret service agent operating in enemy naval ports and intercepted signals. Confirmation of such reports and accurate information regarding the movements of raiders at sea, can only be obtained from patrol-craft reconnoitring far out from the coast. For this duty, speed and a good radius of vision are of primary importance; two factors in which aircraft are far ahead of surface craft. Added to which a number of aircraft capable of patrolling a very large area are much cheaper to build and maintain than one cruiser of low relative speed and vision, capable of covering at cruising speed barely 300 miles in 12 hours, and of small fighting value against capital ships. By this it is not the intention to imply that cruisers are not necessary, on the contrary they should if possible be in the area in which aircraft operate, the latter being regarded as a means of extending the cruisers' sphere of usefulness. For reconnaissance purposes the large flying-boat has a range of well over 1,000 miles cruising at a speed in the region of 100 knots.

In addition to reconnaissance duties aircraft employed for coast defence can be employed to attack raiding surface craft. For this purpose a new torpedo squadron is being formed, to be equipped with torpedo aeroplanes and based at an aerodrome on the East Coast. In addition to units employing this type of aircraft, torpedoes can also be launched from flying-boats of the type used for long range reconnaissance. Owing to their high speed torpedo 'planes can intercept enemy raiders far more easily than can surface craft. Thus at a moderate cost aircraft appear to offer great possibilities for efficient coast defence.

As an illustration of this, it is worthy of note that four flying-boats carrying out an organised system of coastal patrol could during a period of ten hours cover between them a distance of some 3,400 miles; a distance which one of the new cruisers could only accomplish in about 4½ days' steaming at full speed. This shows how four flying-boats can extend the scouting range of a cruiser.

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Commerce Protection.

For commerce protection aircraft operate on fundamentally similar lines to those employed for coast defence and to a large extent the two duties may be combined in one; thus a single air unit can be responsible for both, as was the case during the war 1914–18.

In the war at sea during 1914–18, by far the most important and valuable part played by aircraft was in commerce protection. The general public, even to-day, know little of the valuable work which was carried out by flying-boats and twin-float seaplanes of the R.N.A.S. and R.A.F. in combating the submarine menace and protecting food ships.

The main advantage for commerce protection possessed by flying-boats as compared with surface craft lies in their high speed and radius of vision. The speed factor allows aircraft to cover a much larger area of ocean, while in space of time they still remain relatively near to the convoy. This, combined with their extended sphere of vision, renders it almost impossible for an enemy submarine to lie on the surface on the look-out for the smoke of a convoy without being itself spotted and attacked by the escorting aircraft. Even if such an attack did not result in the destruction of the submarine it would at least prevent the enemy from approaching within torpedo range of the convoy, which after all achieves the desired end.

Commercial Marine Aircraft.

During the summer of 1928 London had an opportunity to inspect the latest products of British aircraft constructors, intended primarily for the development of commercial marine aviation.

Two civil seaplanes, the Short "Calcutta" flying-boat, three 450 h.p. Bristol "Jupiter" engines, and the Blackburn "Bluebird" light seaplane, 80 h.p. Armstrong-Siddeley "Genet" engine, were moored out for inspection off the House of Commons, and they caused considerable interest. It is perhaps not too much to say that these machines were a complete revelation to the majority of the people who saw them, and they brought home to the citizens of London the fact that aircraft now exist which are capable of safely navigating the air above the seas, and of utilising marine harbours as air bases.

It is generally conceded that the development of Empire air communications has now become a matter of the utmost importance. On the other hand, the possibilities of marine aircraft for this work are perhaps not fully appreciated.

The fact that any Empire air routes must traverse vast expanses of ocean is an obvious factor in favour of the employment of marine aircraft. One believes, however, that the real importance of marine airways has a far deeper significance. If we develop Empire flying-boat services we shall have an organisation which would be available for commerce protection in time of war. In short, it may safely be said that the development of marine airways in time of peace would be an important factor in the defence of the Empire in time of war.

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To be of any real value in war it is essential that flying-boats should be available to operate in very large numbers. Unfortunately the maintenance of such a force in peace time is quite out of the question. Thus it is too much to hope that this country can maintain a military flying-boat service in time of peace which would be the slightest use numerically for commerce protection in war. Unfortunately this state of affairs goes deeper because it means that the country only possesses a very small personnel trained thoroughly in flying-boat work, and no aircraft factory organised for the mass production of flying-boats. This is all the more serious because the personnel requires more training and the machines take longer to build than is the case with land aircraft.

By developing marine airways, machines and personnel would be available for commerce protection in an emergency, while factories would be maintained in peace to supply civil flying-boats and they would be available to build these craft rapidly in war.

Thus commercial flying-boat services would perform the dual role of speeding up Empire communications in peace and at the same time they would, once they became self-supporting, provide a valuable asset for the naval defence of the Empire at no cost to the country.

The light seaplane is a type of aircraft which presents great possibilities for the preliminary training of flying-boat pilots. For this reason the formation of light seaplane clubs should be encouraged, as the members would provide a civilian reserve for flying-boats in time of war, just as yachtsmen helped to fill the ranks of the Fleet from 1914–18.

As is well known, there are now light aeroplane clubs in operation in all parts of the country and they are attracting numbers of people to their ranks who otherwise would never have been able to take up flying. Unfortunately at the present time there is no light seaplane club in existence, and one believes, from the naval point of view, it is most desirable that facilities should exist for people to take up marine aviation as a hobby.

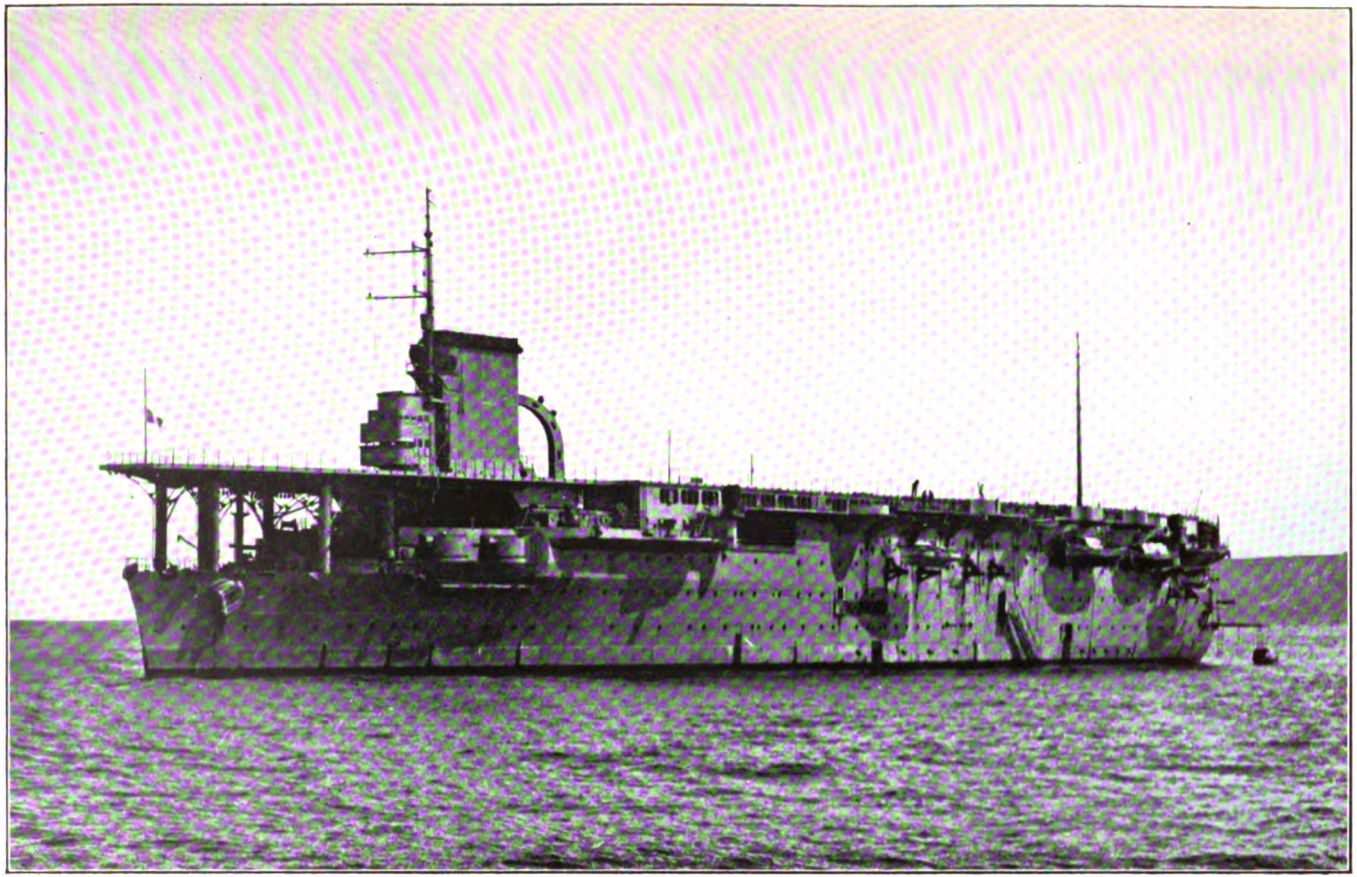
A Commercial Flying-Boat.

Any doubts which may have existed as to the possibility of employing flying-boats to advantage on Empire air routes have most certainly been dispelled by the results obtained with the all-metal Short "Calcutta" type driven by three Bristol "Jupiter" engines.

The first two machines of this type have recently been tested at the Royal Air Force Marine Aircraft Experimental Establishment at Felixstowe, and the results obtained can only be regarded as remarkable.

The "Calcutta" is constructed entirely of metal and has a wing span of 93 feet, with a very roomy cabin to accommodate 15 passengers. There is also a fully equipped buffet in charge of a steward, who has the facilities for serving hot meals en route. Each passenger is provided with a comfortable armchair and a small folding table.

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(*Photograph by Stephen Cribb, Southsea.*)

FRENCH AIRCRAFT-CARRIER BÉARN, 21,160 TONS.

(*Designed as a Battleship*, 1920; *Converted*, 1927.)

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The cabin is decorated in royal blue and white and the roof is lined with buff felt, which prevents the metal from drumming. Even when in flight conversation is easily carried out in the cabin, and no great effort is required to converse over a distance of several feet.

There is no doubt that the " Calcutta " represents a great advance in passenger-carrying aircraft, either of the land or sea-going type.

One of the greatest factors towards safety and reliability in the air is to be able to assure that the aircraft will not be forced to alight between terminal points on account of engine trouble. As no single engine, however good it may be, can be relied upon with absolute certainty never to give trouble in the air, the only way apparent at the moment to avoid the possibility of forced landings is to fit aircraft with more then one motor. When this plan is adopted, however, it will only achieve its object if the aircraft is capable of flying without utilising all the power plants with which it is fitted. In the case of the " Calcutta " there are three engines and the machine can easily fly on two.

Indeed it will achieve more than this. On a recent test flight, with only two engines running and carrying an overload of 300 lb., the machine got off the water after a run of only 42 seconds : a performance which in many countries would be regarded as good for a boat of this size when employing full power. To get a flying-boat off the water requires a great deal more power than would be utilised to maintain a steady cruising speed in the air.

Thus, this test demonstrates clearly that the " Calcutta," carrying its normal load, could easily fly on two of its three engines, should one fail through any cause while making a flight.

An important factor in the case of a commercial machine intended for flights over the sea, which may necessitate long hops non-stop, is its ability to carry sufficient fuel for this purpose in addition to a reasonable pay load of passengers and mails. In this respect the " Calcutta " type appears to be very promising. One of these machines has been tested with an overload of 3,500 lb. This is equivalent to carrying 30 passengers with baggage and fuel sufficient for a trip of 500 miles. These trials have proved that with a slight structural alteration to this type of craft it would be capable of carrying a still further overload of 2,000 lb. Thus, practical trials with the " Calcutta " show quite definitely that commercial flying-boats are now capable of making quite long sea crossings, carrying a large paying load.

Imperial Airways Ltd., have ordered three " Calcutta " flying-boats, which are to be used on an oversea section of the through airway which is shortly to be placed into operation between Great Britain and India.

A Cruise Round Africa.

The " Calcutta " resembles in the main the Short " Singapore," except that the latter is essentially a service type and that it is driven by two 700 h.p. Rolls-Royce " Condor " engines instead of

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the three smaller engines as fitted to the former. In this connection it is of interest to note that during 1928 Sir Alan Cobham completed a cruise from England up the Nile and down the East Coast of Africa to Cape Town, returning to England via the West Coast of Africa. During this cruise which was carried out on the "Singapore" no less than 23,000 miles was flown. This flight proved the ability of the modern all-metal flying-boat to operate from rivers and lakes inland and situated at a high altitude in the tropics. Thus the flying-boat is not limited to operations on oversea routes but can continue its voyage to inland waterways.

A Great Empire Cruise.

What is perhaps one of the greatest flying-boat cruises on record has recently been brought to a successful conclusion by four Supermarine "Southampton" flying-boats, driven by twin Napier "Lion" engines. This cruise, which was from England round India and Australia and back to Singapore, was carried out by a flight of the Royal Air Force, under the command of Group Captain H. M. Cave-Browne-Cave, with the primary object of testing the strategic value of the large flying-boat for Empire defence.

For nearly a year these four flying-boats were engaged away from their base, and flying in formation the whole flight—the greatest of its kind ever attempted—has been carried out without mishap or mechanical trouble. On arrival at Singapore after returning from Australia, a total distance of 23,000 miles had been covered; a remarkable demonstration of the reliability of the British flying-boats and engines selected for the flight.

Surely this flight has proved two very important points: firstly, that for naval co-operation this type of craft can be rushed to any point of the Empire at which our sea communications may be threatened, and operate there without the necessity of constructing costly bases; secondly, that these craft could greatly accelerate our sea transport in peace.

To India and Back.

These two remarkable demonstrations of the capabilities and reliability of metal-hulled British flying-boats have been followed up by still another similar demonstration with a different type of British flying-boat. This flight was made by Sir Philip Sassoon, the Under-Secretary of State for Air, in a Blackburn "Iris" flying-boat, on a cruise of inspection. The cruise was from England, through the Mediterranean to Egypt, then across the Syrian Desert to Iraq and down the Persian Gulf to India, returning by the same route. The whole distance covered by air was about 17,000 miles and it occupied five weeks.

Apart from the political importance of such a cruise, it has great technical significance as a test under the varying climatic conditions experienced under Empire service of another type of modern metal-hulled British flying-boat; indeed the "Iris" is the largest of her class in this country. The "Iris" is driven by three 700 h.p. Rolls-

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Royce " Condor " engines and carries a crew of eight ; accommodation being provided on board to live, sleep and eat. Fully loaded the machine weighs 12 tons and has a range of over 600 miles.

Three more boats of this type are now under construction and these will be employed by a new flying-boat flight to be stationed in the Persian Gulf.

High-speed Seaplanes.

In November 1928, Flight-Lieut. D'Arcy Greig, D.F.C., R.A.F., flying the Supermarine-Napier S 5 seaplane which won the Schneider Trophy for Great Britain in 1927, made an attempt to break the world's air speed record at Calshot. In this attempt he attained a speed of 319·57 miles an hour. Although this is the fastest recorded time ever achieved by man, it unfortunately does not exceed the existing record by 5 miles an hour; therefore, according to the regulations under which world's air speed records are governed, the previous record of 318·62 miles an hour, made by Major de Bernardi, the Italian airman, must still stand. Nevertheless, this speed is presumably permissible as a British record, so that we have the satisfaction of knowing that the British air speed record stands at approximately one mile an hour higher than the world's air speed record.

Particular interest attaches to this performance in view of the fact that the International seaplane race for the Schneider Trophy is to be flown over the Solent during the summer of 1929. On this occasion Great Britain will be called upon to defend the trophy against teams entered by other leading aeronautical nations, such as Italy, France, and the United States.

All the nations who propose to be represented in this contest are hard at work evolving the fastest seaplanes which the best aeronautical brains they possess can produce. It may be assumed that the S 5, which has created this new British record, is in fact a past number, and that already we have seaplanes under construction in Great Britain which are capable of a very much higher speed. The same may be assumed to apply to other countries interested in high speed aeronautical development, therefore, 1929 is bound to witness a considerable advance in the speed of racing seaplanes.

P. L. Holmes,
Major, D.S.C.,
late R.N.A.S and R.A.F.

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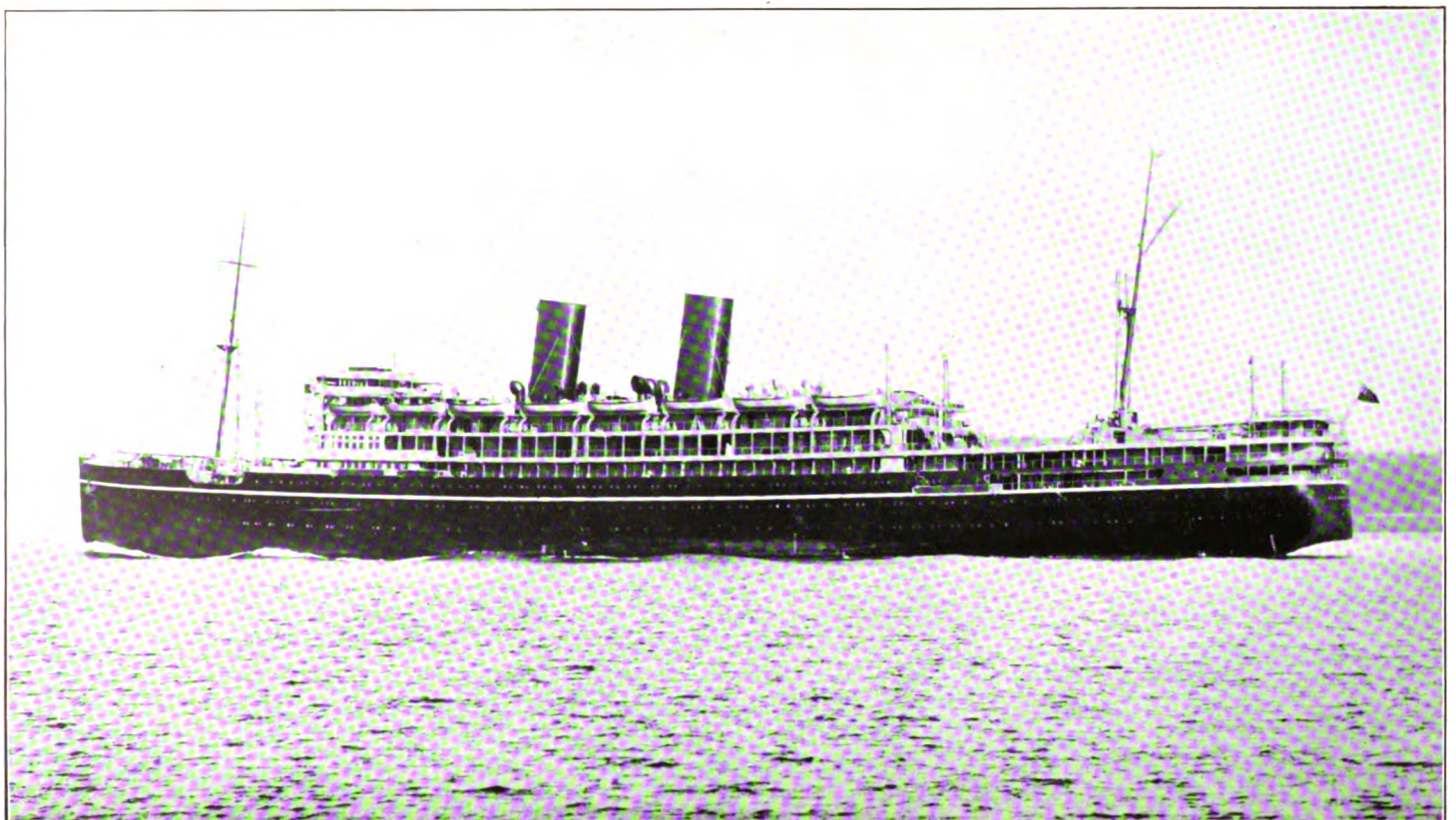
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MERCHANT SHIPPING SECTION.

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(*Photo by W. Ralston, Glasgow.*)

P. & O. TURBO-ELECTRIC LINER VICEROY OF INDIA.

(*Built by Alex. Stephen and Sons, Ltd., Linthouse, Glasgow; Turbo-electric machinery by the British Thomson-Houston Co., Ltd., Rugby.*)

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CHAPTER XI.

Ten Years' Shipping Progress.

Ten years have passed since the world entered on a peace which has passed all understanding. Prophets have come and gone. Forecasts of industrial prosperity, based on the slenderest evidence, have crumbled under the disturbances of the labour world. The crude and hasty assertions made from time to time of the one and only thing necessary to stimulate home industries have proved false. How else can one explain the failure of trade to respond to the changes of the moment? For an example of what is meant one need go no further back than the events which followed the collapse of the tyranny of the extreme labour leaders in 1926. If industrial peace were the only thing necessary to set trade in full motion again, why were shipowners, who anticipated the revival by ordering cargo ships even before the coal strike had ended, left with the ships on a falling freight market? Why, indeed, if the end of the war were the only thing necessary to get commerce going at full blast, did it happen that the ships which were put into the water faster than at any time in the history of the world, could not find sufficient cargoes? Questions such as these have been uppermost in men's minds in the last ten years and so far none has come forward with an answer that will stand the test of ultimate experience.

It is not my purpose to attempt a solution, but rather to show the reaction of shipping to the various moods of commerce amid all the conflicting circumstances which have robbed owners at least three times of the chance of taking advantage of quickening markets.

In 1919 a new era of maritime commerce began. There was no going back to the pre-war basis. The balance of the various mercantile fleets had changed. The forces which impelled, and still impell them, had changed. Even the sea routes had changed. In 1913 the Panama Canal did not exist. In 1919 it had proved its usefulness, the apprenticeship of the war years having sufficed to remove the engineering difficulties which at one time led to serious stoppages. There was full confidence in its safety. New sea lanes had been opened, the shorter sea journeys increasing the potential carrying capacity of the mercantile marine without the creation of a single new ship.

In 1919 the United States was the second largest ship-owning country in the world. Austria was disappearing or had disappeared. Germany was being stripped of her merchant navy. Neutral countries had increased their fleets. Shipbuilding resources had developed enormously, responding to the call for "ships and more ships." Altogether the world's merchant marine was about two

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million tons more than at 1914, notwithstanding the submarine campaign.

In the first five years of peace fifteen millions were added. Then came the collapse and with it the necessity for scrapping inefficient tonnage so that, to-day, the figure stands only about a million and a quarter tons higher than it did after those four years of effort. The development of the principal maritime countries is shown in Table I.

TABLE I.—TONNAGE OWNED BY PRINCIPAL MARITIME COUNTRIES.
(In thousands of tons, '000 omitted.)

	Great Britain and Ireland.	United States (Sea-going).	Japan.	Germany.	Italy.	France.
1914	19,257	2,970	1,708	5,459	1,668	2,319
..	..	..	..	..	..	..
1919	16,555	10,782	2,325	3,503	1,370	2,234
1920	18,330	13,790	2,996	673	2,242	3,245
1921	19,571	14,697	3,355	717	2,651	3,652
1922	19,296	14,738	3,587	1,887	2,866	3,846
1923	19,281	14,597	3,604	2,590	3,034	3,737
1924	19,106	13,530	3,843	2,954	2,832	3,498
1925	19,441	12,949	3,920	3,074	3,029	3,512
1926	19,400	12,365	3,968	3,111	3,241	3,490
1927	19,309	12,070	4,033	3,363	3,483	3,470
1928	19,875	11,997	4,140	3,777	3,429	3,344

	Norway.	Holland.	Sweden.	Spain.	Denmark.	Total all Nations.
1914	2,505	1,496	1,118	899	820	49,089
—	..	..	..	..	..	..
1919	1,858	1,592	993	751	702	50,919
1920	2,219	1,793	1,073	997	803	57,314
1921	2,584	2,226	1,160	1,165	964	61,975
1922	2,601	2,633	1,115	1,283	1,038	64,371
1923	2,552	2,626	1,208	1,260	997	65,166
1924	2,505	2,556	1,254	1,240	1,036	64,024
1925	2,680	2,601	1,301	1,185	1,060	64,641
1926	2,842	2,565	1,338	1,163	1,081	64,784
1927	2,824	2,654	1,365	1,162	1,060	65,193
1928	2,968	2,817	1,447	1,164	1,068	66,955

What is the real value of this mercantile marine of which the world possesses 67,000,000 tons? Let us examine the figures in the light of the progress of naval architecture and the developments of marine engineering. Ten years under ordinary conditions would be a short term on which to base any general observations; but the ten years which have just passed are not ordinary years. In them has been concentrated twenty years' progress, as research workers computed time in the pre-1914 era. It covers a period when instincts were unleashed to give full vent to the aspirations of nations which had tasted the sweetness of maritime influence; when, curbed for years by Blue Book Rates, the common dividend pursuer as distinct from the national idealist sought to reap that harvest which he felt was within his grasp. And in their haste the shipyards of the world were filled to overflowing.

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In the years of civilisation and relative tranquillity before the War the record number of merchant ships building throughout the world at one time was 1,007 of 3,441,000 gross tons. This was at the end of March 1913. At the end of 1919 there were no fewer than 2,138 ships of 7,861,363 tons under construction. In other words the shipbuilding resources of the world had more than doubled. Of even greater significance is the fact that this was not the result of economic necessity spread over the intervening six years, but the outcome, partly of the submarine campaign and then of an inordinate desire on the part of every one with maritime instincts to "get there first" in the great revival of trade which, almost without exception, was believed to be inevitable.

Consequently this astounding development of the shipbuilding industry, fostered by an equally astonishing impetus from shipping interests, was a mushroom growth of little more than about two years' duration. This point should be remembered because ships built with scant attention to details—followed as a matter of common procedure, one had almost said by hereditary instinct, by the older shipyards—come within the category of modern ships as reckoned in the ordinary statistical analysis. Almost without exception they are under ten years old to-day; yet in point of design and equipment they are often indifferent models of the pre-war era.

Ten years ago wrecks that had lain at the bottom of the sea for years had a distinct commercial value if they could be made floatable and carry cargoes from port to port with some pretence at seaworthiness and regularity. If they are still afloat there is no reason why they should not be borne on the registers of the merchant fleet; certainly concrete ships still find a place and are duly included in the grand total, swelling with pathetic regularity the laid up tonnage statistics of the Chamber of Shipping.

Consideration of these facts must necessarily tincture one's estimation of the actual commercial value of much of the statistical evidence that is served up for popular consumption. Of the laid up tonnage figures, for example, how much of the total is ever likely to go to sea again? How much of the shipping tied cheek by jowl in the Hudson River, or even in the backwaters of our own country, can ever proceed to sea as a commercial venture? And how much of this eight- or ten-year-old shipping masquerading under the popular conception of modern tonnage can really compete with the output of the shipyards of later years? The answers to this question are not to be found in the statistical aggregates which the rough-and-ready economists serve so temptingly in a dish of unsupportable optimism. More likely are they to be found in the subconscious reasoning of men in close association day by day with the intimate details of the shipping business.

Let us now examine, in the light of the foregoing, the figures which are available, taking as a basis Lloyd's Register statistics of what we may term post-war shipping and divide this latter into two categories, vessels under five years old and those between five and ten years old, comparing the two with all the vessels

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irrespective of age. They are shown in Table II, the details for countries owning more than a million tons each also being given.

TABLE II.—STEAM AND MOTORSHIPS UNDER TEN YEARS OLD.
(In thousands, '000 omitted.)

Country.	Under 5 years. Gross Tons.	Per cent.	5 years and under 10. Gross Tons.	Per cent.	Total Fleet. Gross Tons.	Per cent. of Tonnage under 10 years.
Great Britain and Ireland	4,483	45	5,392	55	19,754	50
U.S.A. (Sea-going)	336	5	6,691	95	11,154	63
Canada	218	39	336	61	1,188	47
Denmark	199	38	326	62	1,042	50
France	294	21	1,127	79	3,256	44
Germany	812	35	1,490	65	3,738	62
Greece	13	14	79	86	1,187	8
Holland	540	36	965	64	2,809	54
Italy	536	43	721	57	3,349	37
Japan	307	18	1,324	82	4,140	40
Norway	698	47	794	53	2,954	51
Spain	79	19	333	81	1,138	36
Sweden	207	39	315	61	1,412	37
World Total	9,687	32	20,795	68	65,159	47

Contrary to popular conception it will be seen that, taking the merchant fleet as a whole, 47 per cent.—very nearly half on the rough computation of most people—is under 10 years old. This in itself hardly suggests a decrepit mercantile marine. The efforts of individual nations to create or rebuild their merchant fleets to meet post-war requirements are illuminating, some of the more interesting being shown in Table I.

America's story is largely a tale of war-time impetus. The details are well enough known to need no recapitulation here and the figures are a sufficient reminder of a noble effort to assist the Allies. At March 1919, American shipyards had under construction no less than 4,186,000 tons. Last September the volume of work had shrunk to 64,700 tons and at no time during the last five years have there been building more than 120,000 tons. Expressed in output figures, America, which in 1919 turned out 1,051 ships of 4,075,000 tons, now builds annually about 70 ships of 170,000 tons. Whether legislative action under the Jones-White scheme will stimulate shipbuilding there, remains to be seen. Certainly no nation can afford to see its tonnage becoming obsolescent without making an effort at replacement.

On the other side of the picture is Germany. Germany in 1914 owned 5,459,000 tons of shipping and it shrunk, as shown in Table I. through the Treaty of Versailles to 673,000 tons. The steady growth, subsequently, to 3,777,000 tons is a measure of the earnestness of that country to regain at least the position held in 1914 and undoubtedly to surpass it. There has been no voluntary retrogression.

In 1914 there were 297 motorships of 234,290 gross tons. Whatever progress the motorship would have made in years immediately following is difficult to say. Certainly the War retarded its development. There was the general stoppage of shipbuilding construction

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between 1914 and 1917. The subsequent reawakening to the necessities of the allies involved the desire to build and to build rapidly. Advantage was taken of the ability of sundry engineering works to build geared turbines, their relatively easier transportability recommending their construction to the authorities. This undoubtedly stimulated the development of the geared turbine cargo ship, both in this country and the United States, and so the motorship, which had hardly established its reliability, received less attention. In consequence by 1919 there were only 912 motorships of 752,600 tons in existence, this figure also including a large proportion of auxiliary sailing ships of 100 tons and over, which, although they are likewise in subsequent figures, do not assume the same relative importance. Table III. shows how the motorship has developed in the last ten years :

TABLE III.—NUMBER AND GROSS TONNAGE OF MOTOR-SHIPS.

Lloyd's Register Book	Motorships (including Auxiliary Vessels)	
	No.	Gross Tons.
July, 1914 . .	297	234,287
.. ..	..	..
,, 1919 . .	912	752,606
,, 1920 . .	1,178	955,810
,, 1921 . .	1,472	1,248,800
,, 1922 . .	1,620	1,542,160
,, 1923 . .	1,795	1,666,385
,, 1924 . .	1,950	1,975,798
,, 1925 . .	2,145	2,714,073
,, 1926 . .	2,343	3,493,284
,, 1927 . .	2,552	4,270,824
,, 1928 . .	2,933	5,432,302

On the other hand the use of oil fuel for steam raising appears to have made but little progress in recent years. Tables IV. and V. indicate the development of the oil-fired ships, and the growth of the oil-tanker fleet.

TABLE IV.—NUMBER AND GROSS TONNAGE OF STEAMERS FITTED FOR OIL-FUEL BURNING.

Lloyd's Register Book.	Steamers fitted for burning Oil Fuel.
	Gross Tons.
July, 1914 . .	1,310,209
.. ..	..
,, 1919 . .	5,336,678
,, 1920 . .	9,359,334
,, 1921 . .	12,796,635
,, 1922 . .	14,464,162
,, 1923 . .	15,792,418
,, 1924 . .	17,154,072
,, 1925 . .	17,804,122
,, 1926 . .	18,243,539
,, 1927 . .	18,481,759
,, 1928 . .	19,053,014

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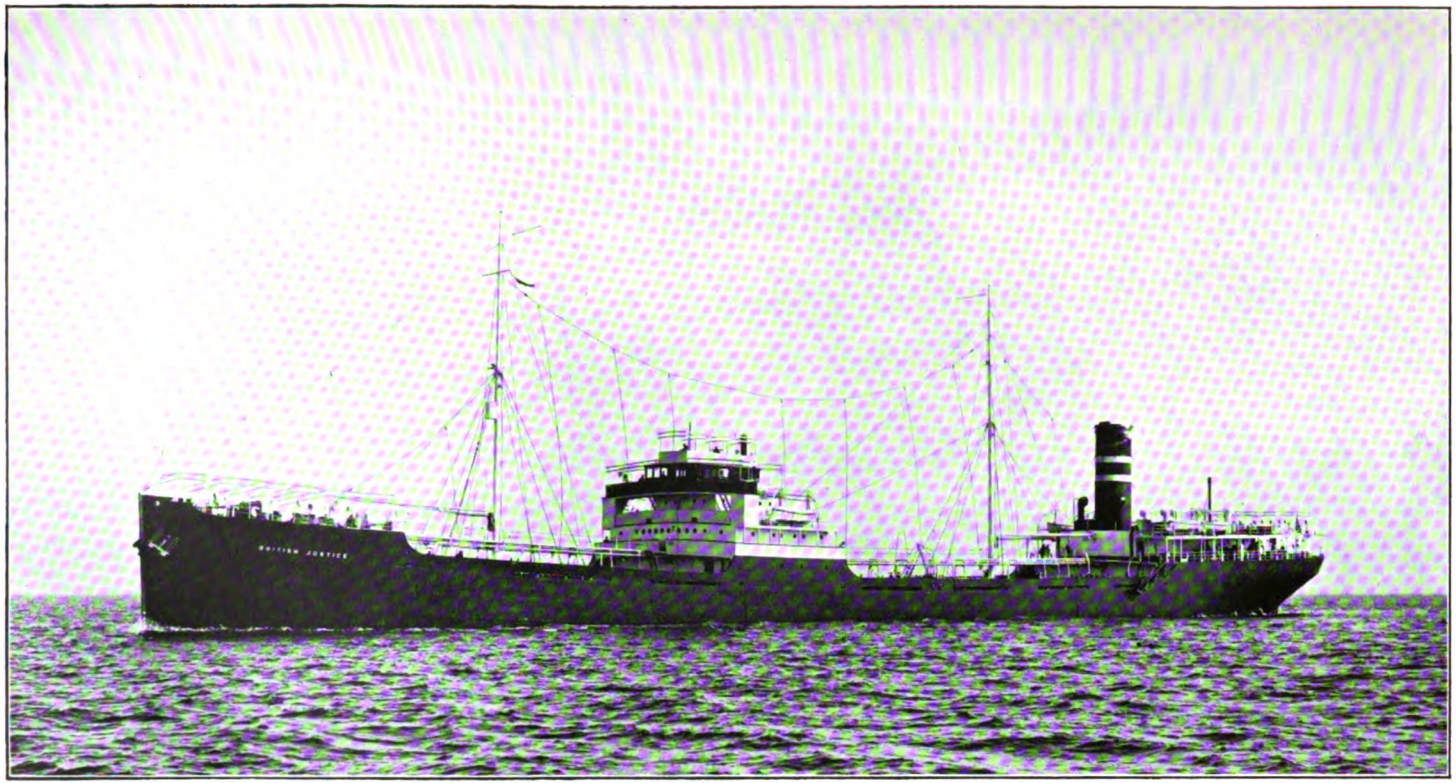
In about two years, that is between 1919–21, the tonnage fitted for burning oil fuel almost doubled. It was the era of the conversion of the big liners from coal to oil. There were two reasons for it. One was the uncertainty of the labour situation in the coal fields; owners were never sure that they could get bunkers in time. The other was a desire, particularly on the North Atlantic, to ensure a quicker turn round, affording increased earning power. There were of course attendant minor advantages, such as greater cleanliness and improved passenger comfort. There have been times when owners may have doubted the wisdom of incurring the expense involved in these conversions. They were not, however, expressed during the coal strike of 1926 when shipping on the North Atlantic was able to pursue an uninterrupted schedule. Partly because the more pressing economic reasons for the use of oil fuel have disappeared; partly because there is now no doubt that in most cases it is much more economical to employ oil in internal-combustion engines; and also because the liner conversion programmes were concluded several years ago, the use of oil fuel for steamships has developed much more slowly. It has, however, made definite progress in the last ten years and, presumably, with the attention now being given to the production of more economical steam units either by means of higher steam pressures or the improvement of mechanical detail, the present ratio of progress will be maintained. As it is, the utilisation of oil fuel on 28·5 per cent. of the total mercantile marine is an economic factor of considerable importance, especially if to this figure is added 8·1 per cent. of motorship tonnage making 37 per cent. of the mercantile marine to-day dependent on oil, as against 3·1 per cent. in 1914. Expressed in another way the tonnage of ships using oil either as motorships or steamships was 6,089,300 gross tons in 1919. To-day it is 24,485,300 tons. During the same period the total tonnage in the world has increased by 16,035,000 gross tons.

TABLE V.—GROSS TONNAGE OF OIL TANKERS.

Lloyd's Register Book.	Oil Tankers, Steamers and Motorships.
	Gross tons.
July, 1914	1,478,988
. . . . .	. . .
„ 1919	2,929,113
„ 1920	3,354,314
„ 1921	4,418,688
„ 1922	5,062,699
„ 1923	5,203,601
„ 1924	5,243,238
„ 1925	5,384,290
„ 1926	5,664,786
„ 1927	5,915,677
„ 1928	6,620,028

Table VI. shows the principal countries owning tankers and oil-fuel-burning steamers, the United States predominating in this respect. On the other hand, notwithstanding popular conception

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(*Photo by Frank & Sons, S. Shields.*)

BRITISH TANKER CO.'S MOTOR-SHIP BRITISH JUSTICE.

(*Built by Palmers' Shipbuilding & Iron Co., Ltd., Hebburn.*)

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the principal country owning motorships is Great Britain and Ireland.

TABLE VI.—NUMBER, TONNAGE AND NATIONALITY OF OIL TANKERS OF 1,000 TONS AND MORE AND STEAMERS FITTED FOR BURNING OIL FUEL OWNED BY THE PRINCIPAL MARITIME COUNTRIES AT JUNE 30, 1928.

Countries.	Tankers.		Steamers fitted for burning Oil Fuel.	
	No.	Gross Tons.	No.	Gross Tons.
Great Britain and Ireland	377	2,101,869	824	5,329,350
Canada	18	119,427	67	181,799
Other British Dominions	21	109,671	101	294,031
America (United States)	383	2,375,121	1,818	8,892,942
Belgium	7	43,291	6	32,474
Denmark	8	52,562	17	59,475
France	27	150,017	99	557,619
Germany	24	113,964	68	443,633
Holland	67	228,272	189	837,848
Italy	54	239,152	95	595,119
Japan	12	64,287	98	598,098
Norway	88	564,210	116	550,714
Spain	8	30,602	25	110,463
Sweden	6	37,541	17	77,110

As is shown in Table VII. Norway, which comes next, owns about half as much.

TABLE VII.—NUMBER AND TONNAGE OF MOTOR-SHIPS OWNED BY THE PRINCIPAL MARITIME COUNTRIES AT JULY 1928.

Countries.	No.	Gross Tons.
Great Britain and Ireland	424	1,536,648
Denmark	115	286,419
Germany	348	477,917
Holland	312	315,489
Italy	138	405,818
Japan	212	156,817
Norway	279	747,466
Sweden	216	364,677
United States	260	489,258

It has already been shown how, between 1919–23, the total tonnage increased from 51 million tons to 65 millions. That, during the earlier years at least, this represents the measure of the shipbuilding impetus is apparent from the fact that, apart from losses by sea casualty, there were practically no ships broken up. Thus in 1919 the tonnage of ships broken up was only 9,938 tons. In 1920 it was 7,801 tons. That these figures are negligible is apparent from Table VIII., which shows the tonnage of vessels lost or broken up.

During the last nine years (figures for the tenth are not yet available) about 4,400,000 tons have been voluntarily broken up. The term "voluntary" is, of course, not quite correct. No one causes his ships to be broken up in a spirit of wanton destruction; nor does he say: "Freights are depressed. There are too many ships. I will scrap 10 per cent. of my fleet." Ships in these hard

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commercial days are only broken up when they are too old to possess a market value on the second-hand market or because it is inexpedient that they should pass into other hands which might be able to use them competitively against the vendor.

Figures for vessels broken up vary very widely. The variations shown in Table VIII. are exceptional, but the irregularities are not unusual. During the period 1905–09 the minimum was 120,000 tons and the maximum 252,000 tons. Corresponding figures for the 1910–14 period were 87,750 and 245,900 tons. The yearly average during 1915–20 was only 10,000 tons, for reasons which require no explanation.

TABLE VIII.—TONNAGE OF VESSELS LOST OR BROKEN UP.

	Lost.	Broken up.	Total.
	Gross Tons.	Gross Tons.	Gross Tons.
1914	773,934	96,728	870,662
..	..	..	..
1919	514,234	9,938	524,172
1920	510,794	7,801	518,595
1921	458,992	77,545	536,537
1922	428,756	315,110	743,866
1923	494,364	962,506	1,456,870
1924	440,404	1,174,258	1,614,662
1925	327,748	653,046	980,794
1926	428,240	798,633	1,226,873
1927	449,700	402,698	852,398

The changes which have taken place in ten years are many. As has been shown they are not merely numerical but they are qualitative. The British mercantile marine has risen from 16,555,000 tons to 19,875,000 tons, making it a few hundred tons higher than it was in 1914. The proportion of modern ships is exceptionally high, 23 per cent. being under 5 years old and 50 per cent. under 10 years old. The United States which progressed from 10,782,000 tons in 1919 to 14,597,000 tons in 1923 owns 11,997,000 tons of sea-going ships to-day. From this total one should deduct approximately 3 million tons for vessels laid up. Nevertheless the total is considerably higher than in 1914, when America owned only 2,970,000 tons. Sixty-three per cent. of the American tonnage is consequently under ten years old but only 3 per cent. is under five years old. Germany, although not yet up to pre-war standard, has in the face of difficulties which might have dismayed stouter hearts, risen from the position of relative insignificance to which she was relegated in 1920 to the fourth maritime nation in the world, with incidentally, nearly the whole of her intricate network of liner services restored if not fully rehabilitated. Japan has more than doubled her pre-war tonnage but her rate of progress has been slower in recent years. Italy, whose national aspirations extend naturally to her mercantile marine, appears to have reached her zenith a year ago. Similarly France has not held the position which she attained in 1922, and the Crédit Maritime scheme is not yet assisting as had been hoped.

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Norway has the distinction of being the only country owning a greater proportion of new tonnage (*i.e.* under 5 years old) than Great Britain and Ireland, but whereas Norway owns 698,000 tons of this character the British figure is 4,483,000 tons.

Evidence of the strength of British shipping may also be expressed by taking the six maritime countries with 50 per cent. or more of their fleets under 10 years old and expressing the analysis in terms of tonnage, thus :

	Under 5 years old.	5 years and under 10 years.
	Gross Tons.	Gross Tons.
Great Britain and Ireland . . .	4,483,000	5,392,000
America (U.S.A. Sea-going). . .	336,000	6,691,000
Denmark	199,000	326,000
Germany	812,000	1,490,000
Holland	540,000	965,000
Norway	698,000	794,000

The lapse of ten years has shown many changes. On the whole the quality of the merchant marine of the world has improved.

Examination of the details of the ships, the superior economy of the propelling machinery and other features would reveal an even greater general efficiency than the above figures would suggest. The British proportion of general tonnage is not so high as it was in 1914. It was 41·6 in 1914 and to-day it is 30·3. The proportion of ocean-going tonnage is, however, 38 per cent. of the world total to-day.

Bearing in mind the conflicting circumstances which have ruled during the years since the war ended, these figures do not suggest any slackening of effort to keep up the general standards of the mercantile marine. Indeed the difficulties seem to have spurred owners to anticipate the competitive stress of ship operation and if, during the first five years, many mistakes were made and production stimulated in the wrong quarters, the events of the last five years show how owners have catered for the requirements of trade with an eye to the possibilities of expansion in the near future.

JOHN P. TAYLOR.

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CHAPTER XII.

Liner and Cargo Vessel Experience in 1928.

As far as has been practicable, the policy of the Council of the Chamber of Shipping has been to nominate each year for the Presidency representatives of liner and ordinary cargo shipping, and also to arrange for alternations between leaders in London and other ports. Reasons which at once suggest themselves for this course are that there are variations in the problems confronting the different interests. These differences always need to be borne in mind when considering the past, present, and future of British shipping. A development for some years past has been for liner companies to become associated closely with cargo vessel ownerships, and the one type of company may be regarded as the complement of the other. At any rate, the liner companies have found it convenient to control cargo ship fleets on which they may draw, if necessary, for tonnage to load on the berth, and to supplement the sailings of their regular ships.

One distinction between the decisions that have to be taken by the managements of the two types of vessels is to be seen when construction is considered. The manager of passenger liner companies has always before him the importance of maintaining his services at the highest possible standard. Progress is continually being made in naval architecture and marine engineering, and there is keen competition to give the travelling public the most attractive accommodation. Were the volume of sea travel not to expand there would still be normally a certain amount of replacement as ships age and become out of date, for the travelling public is inclined to favour the newest. The volume of travel should, however, tend to increase. That it does so is shown by the existence of passenger liner fleets of very much larger carrying capacity than their predecessors. The companies themselves do much to encourage sea travel by the institution of cruises and reduced rates for holidays which, there is good reason to believe, stimulate the habit of travel by sea. Remembering that the British nations are scattered throughout the world and separated from each other by many thousands of miles, there appears to be immense scope for an expansion of sea travel.

The North Atlantic Route.

Among the lines which cater for passenger travel a chief place is held by those engaged in the North Atlantic route. The distance

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compared with that in many other trades, is short, and high speeds, although costly, are easier to provide than in other directions. Besides the volume of travel across the North Atlantic for business purposes there is an immense volume of traffic, particularly from West to East, of a holiday type. The traffic across the North Atlantic in 1928 seems to have been well maintained on the level of the best of previous years, in spite of a Presidential Election in the United States which has, in the past, been found restrictive of travel. New ships are being built for the route and competition in the early future promises to be much intensified.

This passenger trade, like many others, is largely seasonal. Americans come to London in, or for, the summer, and they return in the late summer and autumn. This movement coincides more or less with that in the Eastern trades and in the Australian and New Zealand routes, in which people also come to Europe in the summer and return in the English autumn in time for a summer in the Southern hemisphere. Similar conditions exist in the South African and South American routes. In all these routes other than the North Atlantic, the liner companies cannot exist by passenger traffic alone. Indeed, a very large number of persons living in far-distant countries could not afford the scale of rates which is willingly paid in the North Atlantic for high speed and luxurious travel. The carriage of much cargo on the long-distance voyages enables a lower level of rates to be charged.

Sometimes the task of the liner manager may seem easier than that of the cargo vessel owner. A liner manager has to provide for the maintenance, or growth, of a regular trade, but there are times when the responsibilities he incurs must weigh especially heavily. The fact that he has undertaken to maintain regular sailings itself involves liabilities, the assumption of which may not appear especially irksome when trade is flowing smoothly, but becomes grave when there are interruptions due to causes beyond his control. The great ships engaged in regular liner services represent vast expenditures of capital and the unemployment of such ships for a single day is a hindrance to the earning of interest on the capital expended.

Australia and New Zealand.

In the Australian trade the liner companies encountered serious interruptions and losses in the autumn of 1928 owing to attempts, official or unofficial, by the waterside workers not to carry out the terms of the awards by the Arbitration Court. This system of awards was instituted for the benefit of the workers and the employers are not enamoured of the system. It was made perfectly clear to them, however, that they must carry out the terms of the awards in their entirety and must not yield, as they had done in the past, to demands of the workers for modifications. When the owners had given way they did so in the interests of peace and because they knew how grave a stoppage would be for commerce. Last autumn they found their ships seriously delayed and themselves incurring very heavy

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expenses for reasons quite beyond their control. In such a position they were at a disadvantage as compared with the owner of ordinary cargo vessels who, on the slightest sign of trouble, could leave that trade alone and seek employment for his ships in other less disturbed routes.

On February 15 the Rangitiki, the first of three passenger and cargo motor vessels, of 17,500 tons gross, which have been built by John Brown & Co., is to sail on her maiden voyage from Southampton for Wellington (N.Z.). These ships will have accommodation for 100 passengers in the first class, for 80 in the second class, and for more than 400 in the third class, and they will be designed to carry 13,000 tons dead weight of cargo. In the first-class there are to be as many as 42 single cabins, and in addition to the general bathrooms there are to be 20 private bathrooms connecting directly with single or double rooms. These ships will provide practical evidence of a desire on the part of shipping managers to make sea travel most comfortable. The other two vessels are to sail in September and October of this year. The ships will be the first motor vessels to be employed in the mail and passenger service and the largest ships trading between this country and the Dominion.

This year is also to see the coming of the new steamship Viceroy of India, which has been built for the service of the P. & O. Steam Navigation Company. An outstanding feature of her internal design will be the fitting of the first-class accommodation with single-bedstead or single-berth rooms, some of which will be connected with each other for families. This exceptional design is in answer to the strong demand which exists for single-berth rooms.

South African Developments.

In the South African trades conditions have been far from unruffled. The regular lines which have long maintained services again found themselves confronted with the sailings of cargo vessels, mainly from the Continent, at very low rates of freight. The regular lines were invited to protect the interests of their supporters, and they did so by the adoption of a system in which they undertook to carry similar quantities of cargo to those shipped by the outside lines at still lower charges. The competition again proved very expensive for the regular lines. The one redeeming feature of the year for these was the conclusion of a freight contract with the Union Government for a period of years which stipulated, *inter alia*, for a great increase in the cold storage space provided for the transport of South African fruit, in which further important developments are expected. This meant the alteration of much cargo space in the existing vessels of the fleet, while the new ships that are now being built for the South African service will be designed to give the additional cold storage.

The agreement with the mail steamship company was only concluded after discussions had taken place with other interests. It was clear that the mail steamship company and other lines in

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the trade were in a position to give most favourable terms, since a great organisation had gradually been built up and the managements had accumulated a vast amount of knowledge respecting the actual costs of carrying on the services. In one case a proposal was made that the Union Government should guarantee the vessels of a proposed new line a minimum amount of freight for each voyage. No such guarantee was suggested by the companies already in the trade.

It was significant that no interests proposed to assume the liabilities of the mail steamship company in the maintenance of passenger and mail services of a fine type. The mail steamship company has carried on the regular services with extreme regularity for very many years and has recently built great ships which it may be claimed are actually in excess of the present requirements of the trade. In building these vessels it has anticipated future developments. A very large amount of capital is required for the construction and maintenance of a single ship of this class. It seemed curious that proposals, apparently serious, should be advanced for the subsidising of cargo services, while the mail company was to be left to continue to provide the sailings in connection with which very heavy responsibilities attached. Business men, at any rate, have appreciated the highly successful efforts made by the existing companies in the service to develop South African commerce. It is clearly in the interests of the shipping companies serving South Africa to assist the development of South African commerce to the utmost of their power, and it stands to reason that they will provide all the shipping which there is any fair prospect of employing profitably.

South American Services.

In the South American trade a freight fight from the Continent continued and, generally, there was a plethora of shipping for both passengers and cargo. In the passenger trade the competition of foreign companies continued to be very keen. In the autumn a noteworthy event was the sailing from London on her maiden voyage to Brazil and Argentina of the Highland Monarch, the first of five motor vessels which have been built to replace the existing steamships. The new ships are each of nearly double the size of the old vessels, but it was made clear that there is no intension whatever on the part of the management to vie in the accommodation with that of the " luxury " ships. The Nelson Line has a long established connection among business men and families which it is entitled to maintain and develop. The accommodation provided in the new ships is such as its regular supporters may reasonably look for in view of the developments of the last few years in marine engineering and naval architecture. In the course of this year the other four new motor vessels will take their place in the trade.

One of the considerations which the manager of liner shipping has to face is that he must maintain regular sailings whether the

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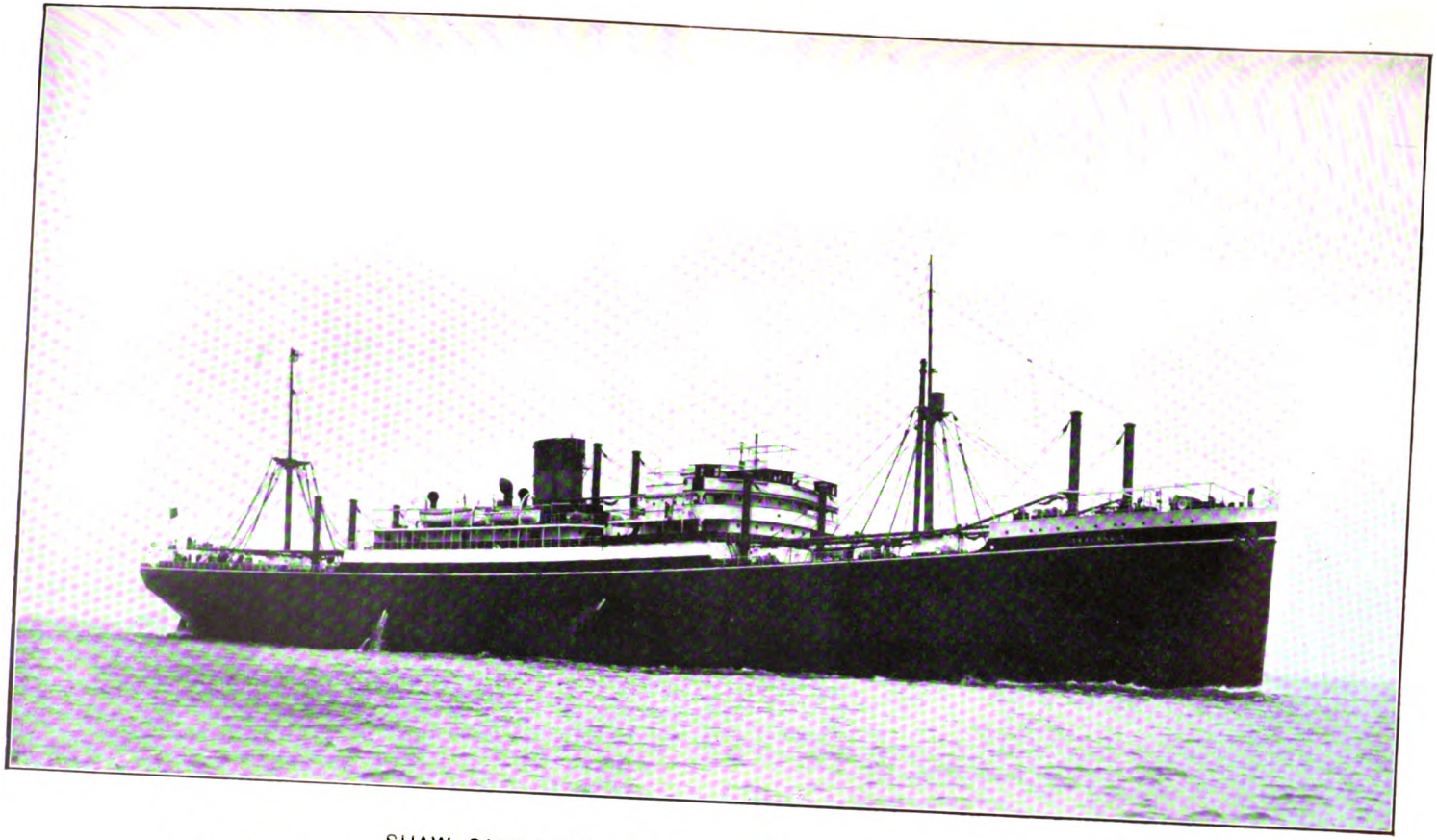
ships are fully laden or not, and it is unquestionable that in many trades in recent years regular liners have sailed with their cargo space only in part occupied owing, largely, to a quiet state of the British export trade. It thus has happened very frequently, especially when passenger liners have sailed in the "off seasons," that individual voyages have resulted in heavy losses, and these have had to be made good by gains on other voyages. Shareholders in many of the regular liner companies would have fared very badly indeed but for the policy of the companies, when profits were secured, of building up reserves on which interest is earned. Some of the great liner companies have now widespread interests in allied industries, so that the actual results from the voyages of the ships represent only a proportion of the total earnings. If and when a time comes when losses on voyages are quite exceptional the position of the companies will be immensely strengthened.

The owner or manager of ordinary cargo, or "tramp," tonnage is always able in times of depression to fall back on laying up. The keeping of vessels idle in ports involves certain expenses and there is a loss of interest on the capital represented by the ships. Obviously the laying up of tonnage is an evil, and the best that can be said for it is that the loss incurred is less than may be suffered when ships are sent to sea at rates far below a remunerative level. Sometimes an owner will accept a poor freight in order to enable his ship to be in the right position to secure attractive earnings at a future date. The manager of cargo shipping must always be looking ahead for several months. In many of the routes the voyages occupy many weeks, and the prudent owner is always considering what the next charter is going to be. When times happen to be good he may run his ships "prompt," which means that he is relying on the freight rates offered for immediate employment being better than those he could secure by fixing ahead. That is a question of policy and does not imply that he has any less regard for the future work of his ships than the owner who holds that he can do best for his tonnage by fixing ahead.

Shipping Laid up Idle.

The returns of shipping laid up idle in the principal ports of Great Britain, which are compiled by the Chamber of Shipping, provide a valuable index to the volume of employment. The greater number of the ships laid up in the ports of Great Britain and Ireland are British, and in the recent years of depression large numbers of foreign vessels have likewise been laid up abroad. To form an accurate idea of how much shipping is unemployed at any particular date it would be essential to take into account such figures as could be obtained from all countries, and it would also be necessary to try to secure particulars of the vessels laid up, with a view to determining which were idle because of obsolescence and which were unemployed at the moment because of periodical surveys. Such an inquiry would be an extremely formidable task, and would

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SHAW, SAVILL AND ALBION MOTOR LINER ZEALANDIC.

(Photo by Frank & Sons, S. Shields.)

(Built by Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne, and engined by the Wallsend Slipway and Engineering Co., Ltd.)

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involve an investigation into the circumstances of every vessel and then deductions would be very difficult to make. It is conceivable that if any event were to occur that made an exceptional demand on the world's supply of shipping, vessels would be drawn temporarily into service which would normally have no place in it. Subject to the limitations on their value, the returns compiled by the Chamber of Shipping provide a rough index to the state of employment and those for 1928 do not reveal a satisfactory state of affairs. The figures for the quarterly dates were at their maximum on July 1, when nearly 500,000 tons were unemployed as disclosed by the figures for Great Britain and Ireland alone. By October 1 the amount unemployed had declined by 80,500 tons net, or 16·2 per cent., but they were still higher by 142,600 tons net, or 52·3 per cent., than those for October 1, 1927. The figures for the four quarterly dates of 1928 and 1927 are as follows :

Quarterly Date.	No. of Ships.	Tonnage.
1928.		
October 1	207	415,399
July 1	233	495,866
April 1	234	363,355
January 1	212	371,674
1927		
October 1	176	272,839
July 1	202	420,164
April 1	168	239,681
January 1	230	364,874

The returns of the Chamber divide the tonnage into ships of less than 1,000 tons, which are employed in the coastwise and short sea trades, and vessels of 1,000 tons and over which are engaged in the long-distance routes. The near trades have been even more depressed than the long-distance routes, and it is noteworthy that on October 1 there were 103 of the smaller type of ships laid up as compared with 104 of the larger vessels. The total tonnage of the comparatively small ships amounted to 33,426 as against 381,973 tons for the ocean-going vessels. The idle tonnage of the latter class therefore represented more than ten times the amount of the smaller type.

Supply and Demand.

Any shipping manager who could accurately assess the relationship between the supply of tonnage and the demand for it would be well fitted to make wise decisions. An interesting attempt was made by Mr. M. Smith-Petersen, in an article given prominence in the publication of the Baltic and International Maritime Conference in the summer. The writer of that article pointed out that in 1913 the total sea-going shipping of the world amounted to 37,000,000 tons, and he contended that the seaborne traffic had only increased

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since then by from 5 to 10 per cent. On this basis it was suggested that a present supply of about 40,000,000 tons should be sufficient, whereas, excluding sailing vessels, oil tankers, lake and coasting ships, there are now about 48,000,000 tons in the world, representing on this basis an excess of 8,000,000 tons. Taking into account the greater speed of modern ships and improved facilities for loading and discharging, it was estimated that the transport facilities had been increased by 40 per cent., which would mean that there was a surplus tonnage of about 13,000,000 tons.

Such a conclusion would, indeed, be gloomy. Happily, there are other considerations which affect the comparisons. There has been a development of long-distance voyages, such as that between Europe and the Pacific Coast of North America, which means that ships are normally longer at sea than when engaged in shorter distance trades. Further, there has been a great increase in the use of oil and spirit for motoring and other purposes, and oil tank tonnage is now a highly important factor in the world's tonnage. Its significance is indicated in the latest annual report of Lloyd's Register, which showed that in July there were 6,620,000 tons of oil tank shipping afloat, as compared with only 1,479,000 tons in July 1914. To some extent oil tank vessels have replaced colliers, but they also carry oil for new uses. Since, before the coming of the motor engine, people did not move about as they do now a considerable volume of increased trade has taken place, besides that due to an increase in population.

Altogether, it is very difficult indeed closely to assess the relationship between supply and demand. There was a good deal of disturbance to shipping caused by the prolonged coal stoppage in 1926, which had the effect of causing freight rates generally to rise to a profitable level. That experience, although the causes were deplored by British owners, was not without its encouragement, since it demonstrated that the surplus was not so large as had been feared. The circumstances of that trade was peculiar, for it was not only that there was increased employment provided but that the increased employment was in one particular route—the North Atlantic—and the rise in rates was due, partly, to the consideration that vessels were drawn from other trades. The improvement in shipping was then unhealthy. Owners, however, have been always quick to seize any encouragement to build new ships, and the fact that the results for 1927 were not so depressing as those for some previous years, induced a number of firms to place orders for vessels.

Freight Market Depression.

For the greater part of 1928 the results were disappointing. But for fine crops in Argentina and the readiness of Europe to buy them the results would have been disastrous. The South American route again proved itself the backbone of cargo shipping. It is a trade which provides cargoes both outwards and homewards. The railways and other large industrial consumers have taken in the past great quantities of British coal. For a time, owing to the

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apparent madness in the British coal industry, the Argentine consumers had to rely on other producers of coal, some of which were able, in the emergency, to secure long-term contracts. Users of coal in Argentina were, however, glad to return to British coal as soon as they could do so, and the coal industry was assisted in regaining its position there by low rates of freight. These, in turn, were made practicable by the considerable volume of employment in the homeward trades and a reasonable level of freight rates. For many months outward coal freights to South America, and also to other markets, were on a very low basis. They fell to a point when it was a question whether it was worth while for owners to accept them, or whether it was not better to send their ships to South America in ballast to earn a very moderate freight homeward, rather than incur the expenses and delay in loading their ships with coal. The chairman of a leading cargo ship company, which had ordered new tonnage, declared in April that 1928 was going to be a very difficult one for shipping. Nevertheless, he believed that it would " come right in the end."

The depression in the industry was so marked that the President of the Chamber of Shipping, Sir William Seager, admitted that he had been much chaffed, in a friendly fashion, for some of his optimistic utterances. At the annual meeting of the Chamber in February he declared that for six years shipowners had the uncomfortable honour of selling their services at pre-war prices while having to meet costs far in excess of this level, but that the real honour of British shipping lay in the outstanding fact that, notwithstanding all its difficulties, British shipping had held its own in the world and showed every indication of continuing to do so. An examination of the figures of new tonnage placed in commission during the previous seven years demonstrated, he declared, that it had only just made up the amount of wastage through losses and breaking up. If that was so it must follow that the expansion of world trade would before long call for more tonnage, and with that would come an improvement in freights. He believed that the demand for employment would soon equal the supply.

Index Numbers.

For the greater part of the year there was little in the freight situation that justified this confidence. Sir Frederick Lewis, speaking at the annual meeting of Furness, Withy and Company in July, said that while freight rates, according to the latest index, were only fractionally in excess of the 1913 average, operating expenses were very considerably higher, and that the capital value of the vessels employed to earn these same freights was many times greater than it had been. The Chamber of Shipping, taking the average for 1913 as 100, gave the following index figures for the first nine months of 1928 and 1927. It will be seen that, with the exception of August, the number for each month of 1928 was below that for the corresponding month of 1927 :

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1928.		1927.	
January	108·3	January	129·7
February	104·7	February	133·3
March	106·8	March	130·4
April	106·0	April	121·5
May	102·4	May	124·8
June	104·7	June	115·0
July	105·2	July	106·7
August	109·53	August	108·5
September	110·26	September	115·0

The lowest point, it will be observed, was reached in May, when the number was only 102·4, which allowed little margin for the generally higher level of working charges as compared with 1913. During the following four months the figure moved gradually upwards. In July there was some little improvement in the demand for tonnage, but a relapse soon followed. There was general disappointment when an improvement, badly needed, failed to materialise. For a few weeks conditions continued to be very unsatisfactory. Then, in the second half of September, a recovery set in and was the more satisfactory because it was gradual and fairly widespread.

An Autumn Recovery.

One of the causes which have usually contributed to an autumn recovery has been a demand from Montreal, when the results of the new grain harvest are known. If these are good, Canada is generally ready to dispose of remaining portions of the last crop, as well as to sell portions of the new crop. In recent years the action of the Canadian producers has been less easy to foresee than in previous years, owing to the institution of the pooling system through which a considerable portion of the harvest is marketed. If those in control of the pool consider that better prices are to be gained by withholding the crop they do not hesitate to do so. In some recent years sales from Canada have been disappointing. This season another excellent crop has been secured and, while for a time Canada successfully refrained from selling, there came a moment when she was ready to market considerable quantities of grain. Every autumn there needs to be much activity at Montreal, if full use is to be made of the machinery for exporting before a closing of navigation at the end of November. This year a substantial volume of chartering was effected on Canadian account. By itself this would have had no important consequences for shipping; the Canadian route is a short one and, if unsupported by other trades, ample tonnage would have been freely forthcoming at very low rates of freight.

Happily for shipowners, this demand from Canada synchronised with a considerable inquiry for tonnage in other directions. Much of the inquiry came from the Atlantic ports of the United States, the Gulf of Mexico, and the Pacific coast of North America. Further,

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there was a marked revival of the demand for ships to load nitrate in Chile, as the result of measures adopted to encourage the export trade in the commodity, which now has to face the competition of the synthetic description. Java was also wanting tonnage for sugar and there were other markets which were ready to take vessels, including Saigon, Australia, and India. Altogether, there was a fairly general demand for vessels.

Higher Freights for Coal.

Such a widespread inquiry was infinitely more satisfactory than the unnatural conditions which prevailed in 1926, owing to the coal stoppage. The greater opportunities provided in the autumn months of 1928 represented a healthy state of affairs. In one direction the improvement in the homeward trades had unsatisfactory consequences, namely, for the British coal export trade. Coal exporters had long had the advantage of very low rates of freight and some of them, not foreseeing, at any rate fully, the improvement which was about to take place in the markets, had contracted to deliver coal abroad c.i.f. on terms which assumed the continuance of the low rates. When the demand for tonnage expanded and owners had the opportunity of choosing from a number of offers they were unwilling to accept the very low freights for coal that had been ruling. Further, tonnage had become widely scattered. Much of it had been sent on long-distance voyages in ballast and was not available for loading coal outwards. The movement was unfortunate for the coal trade, coming as it did on the top of a long series of disappointments. How freight rates moved in 1928 is indicated in the following table, showing those ruling on January 1, July 1, and November 1 :

Homeward Freight Rates in 1928.

Route.	Jan. 1.	July 1.	Nov. 1.
	s. *d.*	*s.* *d.*	*s.* *d.*
U.S. Atlantic Ports to U.K. (grain per qr.)	—	2 6	—
Montreal to U.K. (grain per qr.)	—	2 7½	4 0
Pacific Coast to U.K. (grain per ton)	30 6	29 6	32 0
River Plate (up river) to U.K. (grain per ton)	24 0	23 0	23 6
Chile to Continent (nitrate per ton)	28 0	—	27 6
Vladivostock to U.K., Continent (beans per ton)	34 3	29 3	36 3
Australia (South Victoria or Sydney) to U.K., Continent (grain per ton)	35 3	40 0	44 3
Burmah to U.K., Continent (rice per ton)	30 0	20 0	—
Bilbao to Cardiff (ore per ton)	5 9	6 0	7 0
Cardiff to Lower Plate (coal per ton)	11 0	11 0	13 6
U.S. to Lower Plate (coal per ton)	$3 25c.	$3 25c.	$3 60c.

Generally the development in the employment of tonnage in the autumn was encouraging. Experience has shown that a recovery in oversea commerce has been started by a large movement of crops. When the earth lavishly produces the growers are able to

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sell freely and, as long as they are able to secure prices yielding an adequate profit, they prosper. The movement of big crops benefits the railways, the ports, and the ships. The producers and all those concerned in the marketing and transport of the crops are put in the possession of funds and their buying power is increased. Not only are the producers enabled to buy agricultural machinery and other manufactures, but all the others concerned in one way or another with the harvests are enabled to expend money on the amenities of life. If the improvement in the demand for tonnage is maintained for any length of time new ships are ordered and the construction of these gives an immense amount of employment.

The Sale of Old Tonnage.

British owners, as a rule, have always been anxious to maintain their fleets at a very high standard. Unfortunately, this policy has been coupled with a readiness to sell their old ships to foreigners, thereby receiving more than they would for the vessels were they only to be broken up, and the money they have received for the sales has been applied towards meeting the cost of the new ships. At the same time the foreign owners have been enabled to run the vessels they acquired very cheaply, since they are relieved from the exacting restrictions of the British Board of Trade and incur lower wages bills. Every time a new ship has been built and the one it replaced sold to foreign owners, the supply of tonnage has been increased and competition intensified. It is to be hoped that British owners will, in future, resist the temptation to increase competition in this way and to put rods in pickle for themselves. They have had to face years of severe depression, and adequate remuneration for the services of British ships, which now seems in prospect, would be good not only for the shipping industry but also for all the allied trades. Responsible owners have no desire for any "boom," which always has its repercussions, and wisely look only for conditions which would enable adequate returns to be secured on British shipping and would encourage people to invest their money in an industry the successful development of which is vital to the welfare of these islands.

Cuthbert Maughan.

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CANADIAN-NATIONAL PASSENGER LINER LADY NELSON.

(Built and engined by Cammell Laird & Co. Ltd., Birkenhead.)

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CHAPTER XIII.

Standing of the World's Merchant Fleets.

Writing a year ago we showed that the tonnage owned throughout the world was 65,192,900 tons. On only one previous occasion did the tonnage approach this total, namely in 1923, when the mercantile marine was 65,166,238 tons. This 1923 figure had been attained by the very rapid output from the shipyards and the following year the figure had dropped to 65,023,570 through the breaking up of obsolete vessels. Consequently, during subsequent years little more had been achieved than the gradual addition of new tonnage until 1927, when the figure was just in excess of the 1923 level.

During the year ended June 30, 1928, shipbuilding in Great Britain and Ireland was stimulated by the effort to catch up arrears of work stopped during the coal strike, with the result that the net increase during the year was about a million and three-quarter tons. This is a very remarkable addition to the world's mercantile marine under conditions which are ruling in the freight market to-day, and nothing like it has occurred since 1921–22. The following table shows how the various years compare, the figures being net after making due allowance for tonnage lost or broken up. During last year the amount lost or broken up was under a million tons or much less than during any year since 1922. About this more will be said later.

Table I.—Tonnage of the World.

Year.	Steam and Motor.		Sail.		Total.	
	No.	Tons.	No.	Tons.	No.	Tons.
1913	23,897	43,079,177	6,694	3,890,936	30,591	46,970,113
1914	24,444	45,403,877	6,392	3,685,675	30,836	49,089,552
1915	24,508	45,729,208	6,212	3,532,561	30,720	49,261,769
1916	24,132	45,247,724	6,035	3,435,412	30,167	48,683,136
1919	24,386	47,897,407	4,869	3,021,866	29,255	50,919,273
1920	26,513	53,904,688	5,082	3,409,377	31,595	57,314,065
1921	28,433	58,846,325	4,773	3,128,328	33,206	61,974,653
1922	29,255	61,342,952	4,680	3,027,834	33,935	64,370,786
1923	29,246	62,335,373	4,261	2,830,865	33,507	65,166,238
1924	29,024	61,514,140	3,932	2,509,427	32,956	64,023,567
1925	29,205	62,380,376	3,711	2,261,042	32,916	64,641,418
1926	29,092	62,671,937	3,523	2,112,433	32,615	64,784,370
1927	28,967	63,267,302	3,205	1,925,608	32,175	65,192,910
1928	29,387	65,159,413	3,021	1,795,246	32,405	66,954,659

Owing to the War, statistics were not compiled regarding the vessels recorded in Lloyd's Register Books for the years 1917 and 1918.

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The figures quoted are those in the statistical appendix to Lloyd's Register and an examination of them shows that the countries with the largest increases are the United Kingdom and Germany, where the increases amount to 566,328 tons and 414,205 tons respectively. Of the vessels under the French flag there is a decrease of 125,515 tons. The decrease of the vessels registered in Italy amounts to 54,566 tons, as compared with an increase of 242,753 tons during the twelve months ended June, 1927.

Sailing-ship tonnage becomes each year a diminishing quantity, being now less than half of the 1913 figure, so that the ratio of increase of steam- and motor-ship tonnage is all the greater, the motor-ship showing a very remarkable development. The increase of tonnage owned by Germany is the natural outcome of the depletion of her fleet under the Treaty of Versailles and some of the ships comprised in the total for that country are very noteworthy vessels. The figures, however, do not include the Bremen and Europa of the North German Lloyd and it is not without interest to reflect that in the next year's figures these two vessels alone will account for about 90,000 tons additional. Altogether at the end of June, Germany owned 2,080 vessels of 3,777,251 tons and of these only 27 of 39,184 tons were sailing ships, which is quite a small proportion for a maritime country of her importance.

In analysing these figures in Table I there are certain reservations which should be made before one can estimate the amount of tonnage available for general cargo or mercantile uses. It is necessary to eliminate such craft as tugs, fishing-vessels, paddle-steamers and oil-tankers. There are those who would exclude also sailing-ships, and perhaps, in considering tonnage of a general utility character, it is better to do so. Hence in Table II., by making the deduction shown thereon, it is possible to arrive at an approximate figure of the tonnage really available for carrying goods and passengers.

TABLE II.—TONNAGE AVAILABLE FOR CARRYING GOODS AND PASSENGERS.

	Gross tons.	Gross tons.
Total tonnage of the world	—	66,954,659
Sailing-ships*	1,795,246	—
Oil Tankers (excluding vessels of less than 1,000 tons)	6,544,263	—
Oil Tankers (less than 1,000 tons)	75,765	—
Trawlers and other fishing vessels	838,072	—
Tugs and salvage vessels	359,306	—
Steam barges, dredgers, etc.*	790,954	—
Paddle steamers*	355,162	—
Lake vessels, United States	2,540,517	—
Lake vessels, Canada	322,782	—
		13,622,067
Tonnage available for passengers and goods		53,332,592
Comparative figures as shown in "Brassey's Annual, 1928"		52,182,481
Increase on preceding 12 months		1,150,111

* Excluding those operating on the Great Lakes of America.

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With the decline of the sailing-ship—now only 2·7 per cent. of the total tonnage—it is more convenient generally to disregard sailing-ship tonnage in making statistical comparisons, and on this basis we show in Table III the changes which have taken place since June 1914 in steam- and motor-ship tonnage.

TABLE III.—STEAM AND MOTOR TONNAGE.

Order of Fleets (1928).	Country.	1914. Gross Tons.	1928. Gross Tons.	Difference. Gross Tons.
1	Great Britain and Ireland	18,892,000	19,754,000	+ 862,000
	British Dominions . .	1,632,000	2,750,000	+1,118,000
12	Denmark	770,000	1,042,000	+ 272,000
6	France	1,922,000	3,256,000	+1,334,000
4	Germany	5,135,000	3,738,000	−1,397,000
10	Greece	821,000	1,188,000	+ 367,000
8	Holland	1,472,000	2,809,000	+1,337,000
5	Italy	1,430,000	3,349,000	+1,919,000
3	Japan	1,708,000	4,140,000	+2,432,000
7	Norway	1,957,000	2,954,000	+ 997,000
11	Spain	884,000	1,138,000	+ 254,000
9	Sweden	1,015,000	1,412,000	+ 397,000
2	United States (Sea) . .	2,027,000	11,154,000	+9,127,000
	United States (Lakes) .	2,260,000	2,454,000	+ 194,000
	Other Countries . . .	3,479,000	4,021,000	+ 542,000
—	Total . . .	45,404,000	65,159,000	+19,755,000

The number of sea-going steamers and motor-ships of 4,000 tons or more has increased very considerably since 1914, when there were 3,608 as compared with 6,165 to-day. Of the 6,165, no fewer than 407 are of 10,000 tons and above, and of this number, 51 are 20,000 tons or more. Of these 407, more than half, viz. 232, are under the British flag. On the other hand rather more than half the steamers and motor-ships in existence are under 1,000 tons each.

There are 614 motor-ships, each of 4,000 tons or more, this figure including 95 of 8,000 to 10,000 tons and 39 of 10,000 tons or more. Steamers and motor-ships between 4,000 and 6,000 tons comprise 28·7 per cent. of the world's steam and motor tonnage, the liners of 15,000 tons and upwards accounting for little more than 4 per cent. of the tonnage, although, in passing, it is interesting to note that about 58 per cent. of this category of liner tonnage flies the British flag.

The net addition during the 14 years 1914–28 amounts to 19,755,000 tons, equal to 43½ per cent. of the pre-war tonnage. During the 14 years 1900–14, the net increase was 23,034,519 tons, equal to 103 per cent. of the steam tonnage in existence in 1900. During the 5 years 1909–14 the world increase (8,931,000 tons) amounted to 24½ per cent. of the tonnage owned in 1909, during the 5 years, June 1923 to June 1928, the increase (2,824,000 tons) is only equal to just over 4½ per cent. of the world tonnage at June 1923, the average yearly increase being less than 1 per cent.

As compared with 1914, the largest increases have taken place in the United States (9·3 million tons), and in Japan (2·4 million tons), Increases of over a million tons have also occurred in four other cases. namely, Italy (1,919,000 tons), Holland (1,337,000), France (1,334,000

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tons) and British Dominions (1,118,000 tons), while the increase in Norway is 997,000 tons. The increase of tonnage belonging to Great Britain and Ireland—862,000 tons—represents less than 4·6 per cent. of the tonnage owned in 1914, whereas the increase of tonnage owned abroad represents over 71 per cent. of the pre-war tonnage. Notwithstanding an increase of 1,228,000 tons since June 1923, Germany still shows a decrease of 1,397,000 tons as compared with June 1914.

In 1914 there was owned in Great Britain and Ireland 41·6 per cent. of the world's steam and motor tonnage, but owing to the great increase which has taken place since 1914 in the tonnage owned abroad, the percentage of 41·6 has now shrunk to 30·3. Similar percentages for the two years respecting the next seven leading countries are :—

	1914	1928		1914	1928
United States	9·4	21·0	France	4·2	5·0
Japan	3·8	6·4	Norway	4·3	4·5
Germany	11·3	5·7	Holland	3·2	4·3
Italy	3·1	5·1			

Reference has already been made to the decline of the sailing-ship and the increase of power-driven tonnage. The greatest developments are now taking place in the use of steam turbine engines and of internal combustion engines. There are now 1,418 steamers of 9,682,063 tons fitted with turbine engines and 2,933 vessels (including auxiliary vessels) of 5,432,302 tons, fitted with internal combustion engines, as compared with 730,000 tons and 220,000 tons respectively in 1914. Furthermore, while during the last twelve months the tonnage of steamers fitted with reciprocating steam engines has only increased by about 280,000 tons, there has been an increase of 1,161,000 tons in the tonnage of motor-ships and of 453,000 tons in the tonnage of vessels fitted with steam turbines. The increase in the motor-ship tonnage recorded during the last five years amounts to over 3¾ million tons.

An interesting feature is the comparatively large proportion of motor tonnage included in the merchant navies of some countries. While the total motor tonnage now owned in the world amounts only to 9·1 per cent. of the steam tonnage (in Great Britain and Ireland 8·4 per cent.), such percentage is much higher in the Scandinavian countries, viz. : Denmark 37·9, Sweden 34·83 and Norway 33·87. Amongst the principal countries, Germany has the next highest proportion—14·7 per cent.—and the United States and Japan have the lowest with 3·7 and 4·9 per cent. respectively.

An analysis of the type of machinery now employed also shows that there are recorded in Lloyd's Register Book 58 vessels, with a total tonnage of 662,951 tons (included in the above-mentioned totals for turbine vessels), which are fitted with a combination of steam turbines and reciprocating engines. Another interesting particular is that in the case of 53 vessels with a tonnage of 187,371 tons, a comparatively new system of propulsion has been adopted, viz. : electric motors connected to the screw shaft, these motors being supplied with current from generators which are driven either by

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steam turbines or oil engines. Of these vessels, 41 of 134,339 tons are owned in the United States. The new White Star electrically-propelled liner, which is to be 1,000 feet long between perpendiculars and will have a gross tonnage of about 60,000 tons, was laid down subsequent to the publication of Lloyd's Register and so does not appear in these statistics.

The following figures enable a comparison to be made between the respective employment of coal and oil fuel in 1914 and at the present time:—

TABLE IV.

	1914. Per cent. of total gross tonnage.	1928. Per cent of total gross tonnage.
Sailing-vessels and sea-going barges	8·06	2·68
Oil, etc., in internal combustion engines	0·45	8·11
Oil fuel for boilers	2·65	28·46
Coal	88·84	60·75
	100·00	100·00

It will thus be seen that less than 61 per cent. of the tonnage of the Merchant Marine now depends entirely upon coal, while in 1914 the percentage was nearly 89. It must, of course, be understood that oil is not always used in steamers fitted for burning oil fuel, as such installations can readily be replaced by coal-burning fittings should it happen that oil be unobtainable or its price render it unprofitable.

TABLE V.—TONNAGE LOST OR BROKEN UP.

Year.	Steamers and Motor-ships.		Sailing-ships.	
	No.	Tons (gross).	No.	Tons (net).
1916	1,288	2,724,041	511	284,224
1917	2,605	6,607,261	748	520,206
1918	1,294	3,332,791	325	159,919
1919	425	524,172	241	112,658 (gross)
1920	370	518,595	215	138,959
1921	344	536,537	215	137,720
1922	511	743,866	205	143,946
1923	709	1,456,870	259	259,909
1924	777	1,614,662	239	243,017
1925	553	980,794	186	161,241
1926	656	1,226,873	182	117,070
1927	469	852,398	154	139,671

WAR LOSSES INCLUDED IN THE ABOVE TABLE.

Year.	Steamers and Motor-ships.		Sailing-ships.	
	No.	Tons (gross).	No.	Tons (net).
1916	942	2,189,079	245	139,609
1917	2,211	5,957,913	523	392,449
1918	911	2,674,428	141	69,744

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Table V. shows the tonnage of steamers and motor-ships lost and broken up each year, from 1904 onwards. In connection with these figures an interesting point was brought out by Lloyd's Register. It is that there has been a considerable decrease in the percentage lost during the last five years as compared with other quinquennial periods in pre-war times. The average yearly percentage of steam tonnage lost during the years 1923–27 only amounts to 0·71 per cent., while, for instance, during the years 1909–13 the average was nearly 1·17 per cent. These figures may, of course, to some extent be influenced by the large amount of tonnage laid up during recent times.

The figures for steamers broken up vary to an enormous extent from year to year. During the period 1905–09 the minimum was 120,003 tons, and the maximum 251,900 tons; during 1910–14 the variation is from 87,737 tons to 245,891 tons. During the years 1915–20 practically no tonnage was broken up, the yearly average only amounting to 10,000 tons. Quite different conditions are shown for recent years. During 1921 the tonnage broken up amounted to 77,500 tons; it increased to 315,000 tons for 1922; to 963,000 tons for 1923; and for the year 1924 the total reached 1,174,000 tons. The tonnage broken up during 1925 amounted to 653,000 tons, and to 799,000 tons during 1926, but during the year 1927 the vessels broken up only amounted to 403,000 tons.

Table VI. shows the number and tonnage of steamers and motor-ships 20 years old or more. There are 3,159 vessels less than 5 years old with a tonnage representing nearly 15 per cent. of the total steam and motor tonnage. Vessels of 25 years and over amount to 7,771, but their tonnage is only 15·4 per cent. of the total. Of the vessels built in 1903 or before, over 62⅓ per cent. are of less than 1,000 tons each, and the average size of the others is 2,893 tons; while of the vessels built during the last 5 years only 36·6 per cent. are of less than 1,000 tons each, and the average of the others reaches 4,625 tons.

TABLE VI.—DIVISIONS OF AGE.

	Divisions of tonnage.	(1) Divisions of age—the World.				Total (all ages).	
		20 and under 25 years.		25 years and over.			
		No.	Tons.	No.	Tons.	No.	Tons.
World Total.	100 & under 500	1,547	340,621	3,801	819,032	11,668	2,672,645
	500 ,, 1,000	331	240,465	1,043	759,020	3,044	2,244,859
	1,000 ,, 2,000	448	654,433	1,187	1,702,193	3,910	5,713,660
	2,000 ,, 4,000	509	1,555,288	1,142	3,346,754	4,249	12,361,336
	4,000 ,, 6,000	417	1,987,690	431	2,043,537	3,715	18,722,109
	6,000 ,, 8,000	161	1,078,406	107	723,337	1,843	12,571,408
	8,000 ,, 10,000	42	367,153	30	269,804	549	4,820,213
	10,000 ,, 15,000	12	136,651	27	321,307	280	3,340,383
	15,000 ,, 20,000	12	208,916	1	19,361	78	1,332,913
	20,000 and above	7	173,569	2	42,406	51	1,379,887
	Total . .	3,486	6,743,192	7,771	10,046,751	29,387	65,159,413

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Table VI. (*continued*).

	Divisions of tonnage.	(2) Divisions of age—Great Britain and Ireland.				Total (all ages).	
		20 and under 25 years.		25 years and over.			
		No.	Tons.	No.	Tons.	No.	Tons.
Britain and Ireland.	100 & under 500	473	108,869	1,099	224,676	3,346	783,875
	500 ,, 1,000	74	53,414	167	119,646	690	498,850
	1,000 ,, 2,000	78	113,558	124	172,335	766	1,129,907
	2,000 ,, 4,000	131	414,053	111	352,481	833	2,541,624
	4,000 ,, 6,000	112	518,376	70	339,863	1,225	6,116,395
	6,000 ,, 8,000	21	139,710	34	233,436	546	3,781,359
	8,000 ,, 10,000	18	157,446	8	72,588	182	1,599,390
	10,000 ,, 15,000	9	101,583	15	180,109	146	1,736,280
	15,000 ,, 20,000	6	107,627	—	—	49	840,648
	20,000 and above	4	104,303	2	42,406	27	725,673
	Total . .	926	1,818,939	1,630	1,737,539	7,810	19,754,001

Of the 958 vessels of 8,000 tons and upwards now in existence, 233 have been built during the last 5 years.

Of the tonnage owned in Great Britain and Ireland, 22·7 per cent. is less than 5 years old. The only country which has a larger proportion of new tonnage (less than 5 years old) is Norway, with 23·6 per cent., of course on a much smaller gross tonnage; France, Greece, Japan, and Spain have less than 10 per cent.; and of the United States sea-going vessels only 3 per cent. are less than 5 years old.

SCRUTATOR.

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CHAPTER XIV.

Is the World's Shipping Trade Reviving?

In any discussion of the volume of trade available for the world's mercantile marine and the employment of shipping the increase in the tonnage of merchant shipping competing for employment must not be overlooked. The following table shows the total mercantile tonnage of the world, steam, motor, and sail, as recorded in Lloyd's Register in June 1914 and in June of each year from 1919 to 1928.

Volume of Merchant Shipping.

	Steam, Motor, and Sail Tonnage on Lloyd's Register. Millions of gross tons.
June 1914	49·1
„ 1919	50·9
„ 1920	57·3
„ 1921	62·0
„ 1922	64·4
„ 1923	65·2
„ 1924	64·0
„ 1925	64·6
„ 1926	64·8
„ 1927	65·2
„ 1928	67·0

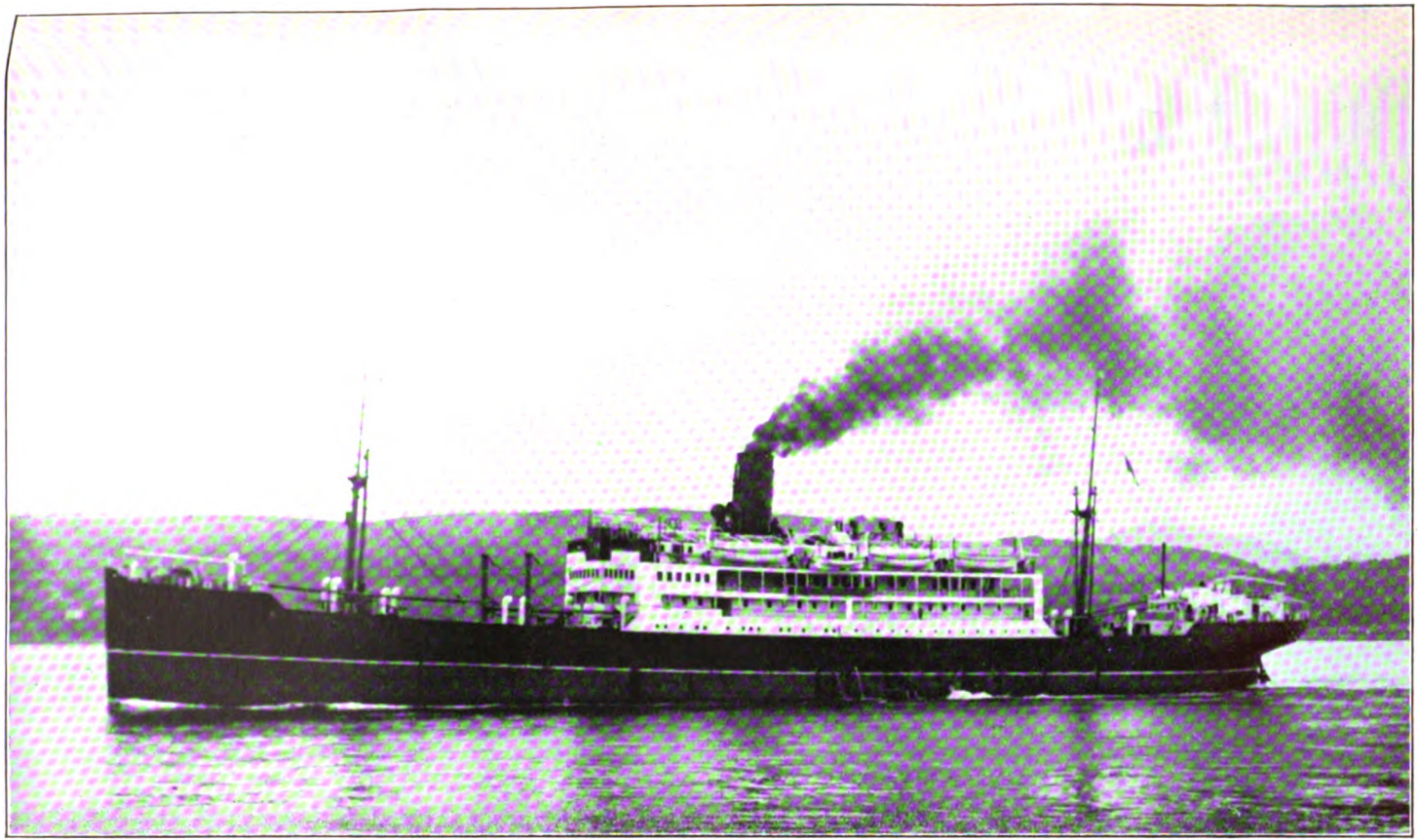
The world's merchant shipping was 36 per cent. greater in 1928 than in 1914. By June 1928 a good deal of the comparatively inefficient tonnage constructed during the War had been weeded out. This was particularly the case with the American wooden tonnage, and although some inefficient tonnage is still included in the total, this is more than counterbalanced by the large proportion of well-equipped tonnage built in the last few years; and it may be said, broadly speaking, that shipping can hardly be expected to be as well employed as it was before the War until the total volume of the world's transport trade has increased by 30 or 40 per cent., as compared with 1913 or 1914. This is far from being the case. While estimates vary, it is doubtful whether the volume of the world's trade in 1927 was as much as 10 per cent. higher than in 1913.

The considerations referred to in the previous paragraph are in themselves sufficient to explain the depression in shipping which set in towards the end of 1920 after the cessation of the special activity of shipping caused by demobilisation requirements, the congestion at ports, and the incomplete utilisation of shipping power consequent upon much of the world's shipping in 1919 and 1920 being still under Government control and direction.

Movement of Shipping.

The question arises—have the last two or three years, and particularly the year 1928, shown any better employment of shipping

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and is there any reasonable hope that the shipping trade is at last reviving? For this purpose figures for the last few years may with advantage be examined.

Considering the United Kingdom, the total tonnage which entered and cleared with cargoes at ports of Great Britain and Ireland in 1913, 1925, 1926, 1927, and 1928 was :—

	Millions of net tons.
1913	116·9
1925	117·8
1926	111·2
1927	124·1
1928	134·8

There are no records showing the employment of shipping for the world as a whole, but the totals for 19 maritime countries, including the Argentine, Belgium, the United States of America, France, Holland, the United Kingdom, and Sweden, were :—

	Millions of net tons.
1925	688
1926	771
1927	783

These figures show a substantial improvement, nearly 14 per cent., in 1927 as compared with 1925. It will be seen that 1926 showed an almost equal increase over 1925, but the increased movement in that year undoubtedly represented a dislocation of traffic caused by the coal strike in Great Britain, with the result that many cargoes that would have been moved in 1926 in the normal way of business were held over to 1927. The extra demand for the use of shipping arising from these two causes encouraged increased building. In fact, during 1925, 672 new vessels of 1,665,000 gross tons were commenced in Great Britain and abroad, and during 1926 the total of new vessels commenced was 515 vessels of 1,411,000 gross tons. During 1927, 863 new vessels of 3,126,000 gross tons were commenced.

By the beginning of 1928 the force of the special factors operating in 1926 and 1927 was spent and the demand for shipping fell off. This has been reflected in a reduction in the tonnage commenced, 2,323,600 gross tons in 1928 as compared with 3,126,000 gross tons in 1927, and can be seen clearly from the following table showing the Chamber of Shipping index number of tramp shipping freights for 1925, 1926, 1927, and 1928. The index number was higher each month in 1927 than in the corresponding month of 1925, but freights in 1928 were on the whole no higher than in 1925.

INDEX NUMBER OF SHIPPING FREIGHTS.
(Average for 1920=100.)

	1925.	1926.	1927.	1928.
January	30·0	25·0	30·4	25·3
February	28·8	23·0	31·2	24·5
March	26·1	21·9	30·5	25·0
April	25·3	22·6	28·4	24·8
May	24·3	22·8	29·2	24·0
June	23·7	23·7	26·9	24·5
July	22·1	26·7	25·0	24·6
August	23·6	27·4	25·4	25·6
September	23·3	32·8	26·9	25·8
October	24·5	43·1	27·3	27·3
November	26·07	46.48	27.75	29·17
December	26·95	33·10	27·11	29·09
Yearly Average	25·29	27·98	27·79	25·79

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In the case of tramp shipping a fall-off in demand necessarily means lower freights and an increase in idle tonnage. In the United Kingdom 574,000 net tons were laid up on October 1, 1925, 860,000 net tons on July 1, 1926, and 278,000 net tons on October 1, 1927, but on October 1, 1928, the figure had again increased to 415,000 net tons, and by January 1, 1929, the total had fallen to 329,771 net tons.

The case is somewhat different with liner tonnage. The movement of liner tonnage does not necessarily fall off; in fact, the number of ships transiting the Panama Canal was 4,673 in 1925, 5,197 in 1926, and 5,475 in 1927, and the number of ships transiting the Suez Canal was 5,237 in 1925, 4,879 in 1926, and 5,545 in 1927. The number of ships transiting the Suez Canal in 1914 was only 4,246. Liner tonnage is affected in the quantity of cargo carried on each voyage, and during 1928 liners have had to go on their regular scheduled voyages with a deficiency of cargo; this has been particularly the case in transatlantic voyages.

A hopeful factor in the last two years has been a reduction in the cost of bunker coal. This may be illustrated by the price of special Durham bunkers f.o.b. Newcastle, which has been as follows :—

	Per ton.
Average 1913	14*s.* 0*d.*
,, 1924	22*s.* 9*d.*
,, 1925	17*s.* 10*d.*
,, 1926 (Jan.–May)	17*s.* 9½*d.*
,, 1927	16*s.* 3*d.*
,, 1928 (Jan.–October)	15*s.* 2*d.*

Other costs, however, are still much higher than they were before the War, and a more or less permanent revival in the prosperity of shipping can hardly be looked for until there is a closer adjustment between the world's trade and the supply of shipping and a further reduction in running costs.

Notwithstanding what I have written and the figures supplied, which are taken from recorded events, I still believe that this trying period of transition will eventually pass away and that the demand for tonnage will increase as the world settles down to actualities and trade barriers are removed, enabling commodities in big quantities to be transported from one part of the world to another. No one would be so foolish as to prophesy when an improvement will take place, but that an improvement will come in the future there is no doubt, each country producing that commodity which she is best fitted to supply.

WILLIAM SEAGER.

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CHAPTER XV.

The Imperial Shipping Committee.

During the Great War, at that period when German submarines were causing the most harm and when British ships were needed to assist in bringing the American armies across the Atlantic, it was necessary to exercise the utmost economy in the employment of the tonnage available for carrying food to Great Britain. Therefore wheat and meat were sought rather from Argentina than from Australia and New Zealand, since two cargoes could be brought from Buenos Aires in the time that it took to bring one cargo from Melbourne or Wellington.

As a consequence, mutton and beef raised by Australian farmers became unsaleable, and rats ate their wheat. Mr. Massey, then Prime Minister of New Zealand, foresaw that at the close of the War the sacrifices which were submitted to when patriotism was at white heat would no longer be tolerated, yet that many months, if not years, must elapse before shipping services could be restored to their pre-War efficiency. In the meantime discontent might reach a dangerous point amongst the producers of foodstuffs and raw materials, for whom the punctual export of their products was essential if they were not to be involved in ruin.

The Beginning of the Committee.

Mr. Massey therefore proposed at the Imperial Conference held in the summer of 1918, that a Committee should be set up to investigate complaints and make recommendations to the Governments of the Empire. The idea was that the advice of such a Committee, being representative of the whole Empire, would be more likely to meet with acceptance than the decisions of any tribunal based on one Government only. At the same conference the Board of Trade of the Home Government tabled a resolution for a Committee to continue the work of the "Dominions Royal Commission" which, before the War, had been surveying the harbours of the Empire and other facilities for communication by sea.

The Imperial Conference was of opinion that two committees would not acquire the same prestige as one, nor would they command the services of men of the same distinction and experience. So it was decided to set up a single Imperial Shipping Committee, with a reference under two heads; on the one hand, to investigate complaints and, on the other hand, to survey facilities.

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Terms of Reference.

The exact terms of the reference, as finally settled in 1920, were as follows :

(1) To inquire into complaints from persons and bodies interested with regard to ocean freights, facilities and conditions in the inter-Imperial trade or questions of a similar nature referred to them by any of the nominating authorities and to report their conclusions to the Governments concerned ;

(2) To survey the facilities for maritime transport on such routes as appear to them to be necessary for trade within the Empire, and to make recommendations to the proper authority for the co-ordination and improvement of such facilities with regard to the type, size and speed of ships, depth of water in docks and channels, construction of harbour works and similar matters.

After the War negotiations took place as to the composition of the Committee and it was not until the autumn of 1920 that it was authorised to begin its work. In form it was appointed by Mr. Lloyd George, as Prime Minister of Great Britain, but in fact it was from the first a truly Imperial body, since the representatives of the Dominions were appointed by him on the nomination of the several Governments. That was in the days before the great "Status" Conference of 1926 had made us particular as to the niceties of constitutional form. In the Imperial Conference of 1923, after the work of the Committee in the first three years of its existence had been considered, any question of its Imperial standing was set at rest by the following unanimous resolutions :

(1) That the work accomplished by the Imperial Shipping Committee is convincing proof of the wisdom of its establishment and that it is of the highest importance to the Empire that this work should continue ;

(2) That it is, therefore, desirable to maintain the Committee on its present basis, deriving authority from, and responsible to, the Governments represented in the Imperial Conference.

Committee Personnel.

The Committee consists of eight Representatives of the Governments of the Empire, five persons selected for their experience of shipping and commerce, and an impartial Chairman agreed upon by all the Governments. Some of the Dominions have appointed to represent them their High Commissioners in London, as for instance Canada, New Zealand, Newfoundland and India ; but others, as for instance Australia, have appointed shipping experts. Mention may perhaps be made of two men, no longer members of the Committee, who in the early days of its history rendered great service—the late Sir William Meyer, High Commissioner for India, and Sir Kenneth Anderson, Chairman of the Orient Line.

The Committee started by taking up that portion of the reference which directed a survey of the facilities for shipping within the

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Empire. Much evidence was heard, and in the course of about six months a considerable amount of information was put together.

Then two things happened. On the one hand, it was found that the whole shipping world was in such a state of flux, that it was hopeless to think of obtaining, for a considerable time to come, any general report which would not be out of date before it had been presented. On the other hand, the Committee were overwhelmed with complaints. It was therefore necessary to turn for a time exclusively to the first part of the reference.

In the two or three years immediately after the War there was undoubtedly a state of considerable irritation as between the shipowners and those who shipped goods, and in this condition of affairs there was no little danger to friendly relations within the Empire. The chief shipowning community of the Empire is the United Kingdom, and on the other hand there are great communities in the Dominions dependent on the shipping of their products over the seas; it seemed, therefore, that the quarrels might take on a geographical and political aspect, since the producers in the Dominions would naturally appeal to their Governments for support against the shipowners, who in their turn would expect the Home Government to defend them, or at least not to interfere with their freedom of action in defending themselves.

In an Oceanic Empire it is obviously vital that oceanic communications should operate smoothly, and the members of the Committee felt that for the time being they could render no better service than by devoting themselves to the removal of friction and the appeasement of irritation.

Early Problems.

Two general questions came up immediately, both of long standing but both embittered by post-War conditions: (1) the responsibility of shipowners for loss and damage under bills of lading; and (2) the system of deferred rebates.

The question of the liability of shipowners under bills of lading had become acute because of the prevalence of pilferage in the demoralisation which was a consequence of war mentality. The remedy was difficult to prescribe, because no one quite knew who was to blame; every one said the other man. If you went to the shipowner he said the pilferage was at the docks, but if you went to the dock authorities, they said it was on the railways. In the United States and in some of the Dominions of the British Empire, legislation had been passed prohibiting the shipowner from contracting himself out of his common law liability by endorsement on his bills of lading. The shipowners vigorously protested against proposals to extend such legislation to Great Britain, the great shipowning country. On the other hand, the merchants, especially in the Dominions, were determined to find a back on which to place their burdenof loss.

The dispute is now over, and it is unnecessary to go into detail in regard to it. Suffice it to say that on the Committee the repre-

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sentative shipowners came to appreciate the pressure which was being brought to bear on their colleagues from the Dominions, and these latter on their side realised for the first time the difficulties of the shipowner. A compromise was arranged, but was not unanimously signed until the shipowners on the Committee had persuaded some of the more important shipowners outside to accept the decision. No sooner was this discussion ended in the Committee than the Imperial aspect of the question became merged with international negotiations, and ultimately the Hague Rules resulted, which, before final adoption, were modified in certain respects to harmonise with the Committee's Report.

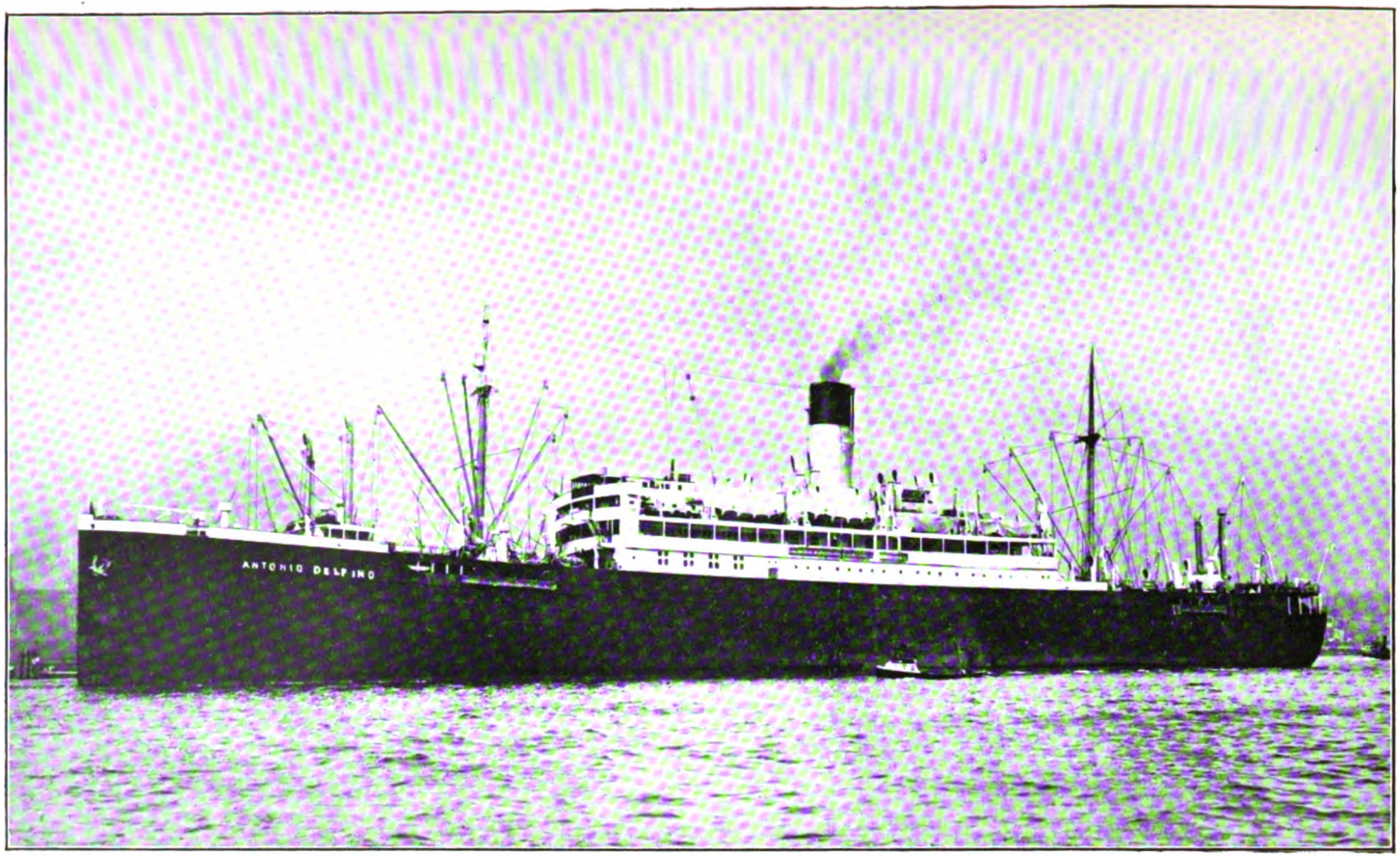
Deferred Rebates.

On the vexed question of deferred rebates, a Royal Commission had held a long inquiry at the beginning of this century, the occasion being a dispute in the South African trade. That Commission ultimately produced three Reports: a Majority Report, a Minority Report, and the Report of a Single Member, which last was a very weighty document. No action came of such divided counsels, and at the end of the War the whole question was reopened as the result of the establishment of the Australian Government Line of steamers, and of the effort of the Lines comprised in the Australian Shipping Conference to meet this competition by means of deferred rebates offered to their customary clients. The discussion in the Imperial Shipping Committee, to whom the matter was referred, had almost reached a deadlock when the suggestion was made, which proved acceptable to all parties, that the question should be allowed to settle itself by the offer on the part of the shipowners to their shippers of the alternatives of a contract with liquidated damages or a deferred rebate.

In dealing with these two great controversies the Imperial Shipping Committee learned how to conduct its business. There must be unanimous reports, for only in that way can a purely advisory body obtain the influence which will ensure the acceptance of its decisions. Majority and minority reports would only marshal differences and tend to division within the Empire. There are two risks of division in the Committee: the representatives of Governments might disagree owing to their different geographical and economic circumstances, or the commercial and shipping experts might differ from the Government representatives. By patience and mutual tolerance the habit of unanimity has been acquired.

A second very important requisite is that the reports made by the Committee should not only be based on the facts as ascertained by exhaustive and impartial investigation, but also that they should be accepted as practicable by the parties concerned. With this object it has been necessary not only to hear witnesses, but also to make private inquiries through the various members of the Committee who are in constant relations with their Governments or with great private interests. Thus the work of the Committee has not only been quasi-judicial but also diplomatic; it has aimed not only

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HAMBURG—SOUTH AMERICA LINER ANTONIO DELFINO.

(*Equipped recently with Bauer-Wach Exhaust Turbine. Total I.H.P., before conversion*, 6,200 ; *after conversion*, 7,250.)

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at arbitration but also at conciliation. Inevitably, therefore, the investigations have in some cases been prolonged.

Routine Work.

After the two general questions to which reference has been made had been reported upon, the Committee settled down to a routine procedure. Many complaints have come before it, usually in connection with particular trade-routes. To enumerate some of these, mention may be made of the inquiries into cargo rates from New Zealand, into the speed of vessels between Great Britain and Australia, into the steamer services to East Africa, into differential rates charged on Canadian flour shipped via Canadian ports and via New York, and into insurance rates to Canadian ports. These complaints originated from the several Governments except in the case of East Africa. Other inquiries have been undertaken at the instance of great private interests as, for instance, that into the income tax assessments on shipowners in different parts of the Empire, where the Chamber of Shipping of Great Britain was the complainant, and into rates charged on cocoa from the West Indies, where the West India Committee took the initiative. The foregoing disputes were mostly the subject of reports issued in Great Britain as Parliamentary papers, but many minor reports have not been published, as for instance, on the shipping services to the Falkland Islands, and the shipment of rice from Burma.

It may be a matter of general convenience that two decisions of the Committee on questions of procedure should be made more generally known among those concerned. It will have been noticed that, according to the terms of reference, complaints may come to the Committee from "persons and bodies interested" as well as from Governments. The Committee has assumed that the Governments of the Empire did not intend that these words should be interpreted as permitting irresponsible persons and bodies to have recourse to its procedure for vexatious or idealistic purposes, and it has therefore ruled that the "interest" of complainants in the matter under dispute must be serious and considerable. Further, the Committee has decided that it will not intervene where the question is of the raising or lowering of particular rates, unless it can be shown *primâ facie* that the charge is of a tyrannous or otherwise exceptional nature and not in the ordinary course of trading adjustment.

At the Imperial Conference of 1923 the proposal was mooted of giving the Committee power to compel the attendance of witnesses and the production of papers, but the Committee deprecated any such action, unless and until it should become necessary. The greatest care has been given to maintaining friendly relations with all the parties with whom the Committee has to deal, and it is obvious that such relations would cease to be easy if compulsion were behind every request. It must not be forgotten that the Committee has already the power of publicity, which is very great where the Press of the whole Empire is available for making known reports rendered to all the Governments of the Empire.

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Port Inquiries.

Under the second head of the reference to the Committee no attempt has been made to carry out an academic survey of the facilities for communication by sea within the Empire. The method followed has been similar to that adopted under the first part of the reference; in other words, specific matters have been investigated as they became important for practical reasons. Of late, for instance, a number of harbours of the tropical parts of the Empire have been passed under review at the instance of the various Governments and Port Authorities concerned, but in each case with reference to some scheme for extension. Among these harbours have been Colombo, Penang, Singapore, Hongkong, Dar-es-Salaam, and Lagos. As a rule the Committee has counselled caution in expenditure. The local people know, as no one else can, the local conditions and opportunities, and the function of the Committee has been to gather and marshal the views of those, like the great shipping companies, who look upon a port as one point only in a long trade-route. Considerations quite apart from the local facilities offered may determine whether it is worth the while of shipping to call at a given port, and large sums of money have been at various points in the world sunk fruitlessly in what appeared to local interests to be most promising engineering schemes. At the present time, when the economics of ocean traffic are likely to be much changed as a result of new methods of propulsion, competition from the air, and more direct ways of commercial exchange, the balance of advantage as between greater port facilities and lower dues is often very difficult to determine from the shipowner's point of view, and it is on his patronage that the success or failure of a harbour undertaking must obviously depend.

Shipowner and Shipper.

There is one question which in one form or another is constantly before the Imperial Shipping Committee. The shipowners of Great Britain regard shipping as a trade, like any other trade, and demand the utmost freedom in the conduct of their business—freedom either to compete or to combine. Many shippers of goods, on the other hand, especially in the Dominions, would like either to forbid combination among shipowners and so secure, as they hope, the advantages of competition, or alternatively to reduce shipowning from a competitive trade to a public utility service, as in greater or less degree are the railways. There is much to be said on behalf of both parties. Shipowners trade on the international oceans; if their foreign competitors threaten them with a cut rate, say from Hamburg to Buenos Aires, they must reply by lowering their own rates or else abandon their share of the Hamburg-Argentine trade. Thus the rates in a particular trade may for a time become abnormally and uneconomically low and, as for instance in the case just cited, the manufacturers exporting from Germany may quite likely enjoy the advantage of lower rates than their competitors exporting from England. Therefore, there is a very natural outcry

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that British shipowners are penalising British manufacturers in the world markets. In each such case that arises, and these disputes take various forms, there are many considerations to be ascertained and borne in mind, and it would not be proper for the writer of this chapter, who may have to preside over inquiries involving this difficult issue, to enter into detail in regard to them. In view of the magnitude both of the shipowner and shipper interests in the Empire and of their fundamental interdependence, it does not appear that under the present conditions of ocean trade any universal solution of the dilemma involved is practicable. The Imperial Shipping Committee have recommended that the shippers should organise themselves in Associations to negotiate with the Conferences of Shipowners, and in those cases where there is failure to agree, the Imperial Shipping Committee will itself be available as an umpire.

H. J. MACKINDER.

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CHAPTER XVI.

The American Merchant Marine.

America's participation in the world of ships and shipping extends over a period of more than 300 years. Its pioneers and early developers were kith and kin of those 17th-century sea-minded people who had a pride in ships. It is not to be wondered at that when those adventurous souls found themselves in the new country where the makings of ships were near at hand—so much so, that even to find a place to land it was necessary to chop down and burn up potential ships—their pride in ships was translated into action and there came off the ways in the new country ships in which the builders had a just pride and the sailors a supreme satisfaction.

In both the pre- and post-Revolutionary periods of America's history she enjoyed a high degree of success on the seas. This was most marked during the early part of the 19th century when the American packet ship was at its zenith and continued during the period the clipper showed its heels to all competitors. During those days the American flag was familiar in the Seven Seas and all the lanes of commerce were shaded with the flying canvas of vessels under that flag. The reasons for this extended period of maritime prosperity, which had its ebbs and flows brought about by competition and legislation, domestic and foreign, was primarily attributable to the fact that the America of that day had (1) a homogeneous "ship-minded" people located on the eastern coastal fringe; (2) the raw material for ships near at hand and obtainable at very low cost; (3) the skill and the will to build ships; (4) the ability and the desire to sail ships, and that always coupled with the conviction that the proper view of one's ships to give to competitors was a stern view.

In 1830 the United States carried in its own vessels approximately 90 per cent. of its exports and imports. The decade ending with that year marks the height from a percentage point of view of America's participation in overseas trade. During the period from about 1821 to 1860, ships under the American flag carried an average of over 77 per cent. of the country's foreign trade.

Early Trade Barrier.

In 1817, by legislative enactment, vessels of foreign nationality were barred from participating in the domestic trade of the United States. That bar has never been raised or altered and is in force to-day. From the most modest beginnings of over one hundred years ago, when the coastwise fleet was made up of vessels averaging

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about 60 tons and the total fleet aggregated less than 600,000 tons, it has grown until the figures for 1927 indicate that there are now participating in the coastwise trade of the United States nearly 21,000 vessels of five tons and over, which total nearly 9,500,000 tons. This number includes 725 vessels of 1,000 gross tons and over, totalling 3,500,000 tons. During 1927 the total freight carried in the coastwise trade amounted to 117,000,000 cargo tons.

A Period of Decline.

About 1840 there appeared in the North Atlantic trade the forerunner of the modern palatial vessels of to-day, the so-called steam mail liners. Contemporaneous in time another revolution in shipbuilding was taking place. That was the substitution of iron for wood in hulls. For a time the proponents of the old order, sail, would not concede the virtues of the then modern ships of iron propelled by steam machinery, but, of course, eventually they had to capitulate. In this new order of ships and shipping Great Britain was a pioneer and soon established a supremacy that has endured to the present day.

While this transition was going on the United States was drifting into domestic complications, which more and more monopolised the thoughts and energies of its people and for the time being blotted out that pride in ships which had given it such a commanding place in the era of sail. These domestic difficulties culminated in the war between the States, and at its conclusion in 1865 the entire country was prostrated from the results of the terrific struggle in the fratricidal strife. In the rehabilitation period after the war of 1860 to 1865, the minds of Americans were focussed on the development of land transportation and the opening-up of the so-called Inland Empire. Rail transportation and unrestricted immigration aided in the development of an area that only needed the sweat of labour to yield its fruits. Such development monopolised and satisfied the people for many happy and prosperous years.

Position in 1914.

This period of remarkable growth and prosperity smothered all interest in the questions as to how imports came to America and how exports went from her shores. Little or no thought was given to the fact that the merchant flag of the United States had practically disappeared from the Seven Seas and that the imports and exports were maintained by vessels of foreign flag. In 1914 the records disclose that less than 10 per cent. of American foreign trade was carried in American ships.

During the long period of this decline in ships and shipping there were a sturdy few who kept alive their pride in ships and pointed continually to the danger of this condition. They were firm in their conviction that America, owing to its geographical situation, would have cause to rue the day when it became impotent in the matter of overseas transportation. That they were right is now conceded, for the World War compelled the United States to

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spend three thousand million dollars in a shipbuilding programme to supply imperfectly the deficiency in ships that this policy, or lack of policy, had brought about.

Present-day American maritime authorities claim that the amount necessary to equalise the handicaps against American ships competing in foreign trade and " keep upon the seas an American flag merchant marine, as the Merchant Marine Act, 1920, says, ' of the best equipped and most suitable types of vessels, sufficient to carry the greater portion of its commerce, and serve as a naval and military auxiliary in time of war or national emergency,' amounts to from one-eighth to one-quarter of one per cent. of the present value of our foreign trade." Its war-time shipbuilding expenditure would have provided the aid necessary to equalise the existing handicaps against American ships competing with ships of foreign flag for a period of 200 years, based on the present value of United States foreign trade.

With the outbreak of the World War in 1914, the American people realised suddenly that the flow of their foreign commerce was seriously impeded. They were forcefully reminded that the stress of world conditions demanded the use of foreign ships by their respective governments, and that the American policy of depending upon ships of foreign flag to carry over 90 per cent. of their exports and imports had left them helpless. The congestion at the seaboard, where piers were piled high, warehouses filled to overflowing, and cars lined the tracks for miles inland, will be an everlasting reminder, particularly to the interior of the country, that the vast land arteries of transportation must be coupled with a system of water transportation in matters pertaining to foreign trade.

Birth of United States Shipping Board.

The seriousness of the situation became so acute by 1916 that national legislation was enacted creating the United States Shipping Board. Six months later, when the United States became involved in the War, the deficiency in ships to serve as naval auxiliaries was even more glaringly apparent. The vital issue then confronting the United States and her people was to provide a " bridge of ships " to France, and to accomplish this she embarked on a stupendous shipbuilding programme the like of which the world had never seen.

The facilities of the few available shipyards were rapidly expanded; new shipyards came into being overnight. In the remarkably short time of approximately 18 months the shipbuilding industry of the United States had grown from a mere handful of shipyards employing about 50,000 men, to more than 200 yards with a total of over 350,000 workers. An additional 180,000 were employed in the 553 mills and factories that supplied the engines and boilers. During this interval contracts had been placed for 3,270 ships of 18,407,276 deadweight tons, and when the Armistice was signed the United States had spent and committed itself for approximately three thousand million dollars to build ships, all under war-time stress and without regard to their use thereafter for peace-time purposes.

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ARGENTINE DOUBLE-ENDED DIESEL-ELECTRIC SHALLOW-DRAUGHT FERRY.

(*Built by Yarrow & Co., Ltd., Scotstoun, Glasgow.*)

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The problem confronting the American people at the close of the War and since has been to work out a plan which would prove most beneficial in utilising and putting to work the great number and variety of vessels it acquired as a result of its war-time activities.

Useless Tonnage.

In this connection we must not lose sight of the fact that more than a thousand ships of over 3,500,000 deadweight tons, built to meet the war-time emergency, were entirely useless for commercial purposes. As an example, the hundreds of wood ships, as well as the composite and concrete ships, were worthless for normal peace-time operations. Likewise, the hundreds of small lake-type vessels could not be utilised for overseas shipping service. The remainder of the fleet was composed principally of duplicate types, built from the same designs in order to expedite construction. Many who thought America had finally acquired a real merchant marine were sadly disappointed. What these ships really made up was a highly unbalanced merchant fleet, most of which was unsuitable for post-war competition. The best that could be hoped for was that some of them might serve as a nucleus for a real American Merchant Marine in the future. The Merchant Marine Act, 1920, reflects the policy which the American people deemed wisest. It should be observed that this Act states that the ships are "ultimately to be owned and operated privately by citizens of the United States."

In the matter of disposing of the Government-owned vessels to private ownership the United States faced an entirely different problem from that which confronted any of the other maritime nations. The owners and operators of the ships of other countries were eagerly awaiting the return of their ships to resume their operations in well-established trade routes and well-defined shipping activities.

Contrast this situation with the position of the United States. There were practically no pre-war American services in overseas trade. The burden and duty of the United States Shipping Board was to carry out the provisions of the Merchant Marine Act, 1920, to dispose of the ships to private ownership as rapidly as possible, also to establish and pioneer services in essential trade routes. Out of a total of 2,543 ships of 14,706,217 deadweight tons originally acquired through construction by direct contract, commandeered while under construction, or obtained through purchase, seizure, or transfer, the Board had on November 1, 1928, sold 1,602 vessels of 7,952,163 deadweight tons.

New Shipping Services.

Since the passage of the Merchant Marine Act, 1920, the Shipping Board has established a large number of shipping services in essential American foreign trade routes. Fifteen of these services have been sold to private American interests, who have guaranteed restricted operation over periods of five years or more. With regard to the 22 lines which are still under Government operation, the Board is

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continuing its efforts toward bringing these services to a point which will make them sufficiently attractive to induce American private capital to purchase them. When all the circumstances are considered it would appear that the United States Shipping Board has carried out the provisions of the Merchant Marine Act, 1920, with efficiency.

Obsolete Tonnage.

At the time of the passing the Act of 1920, and frequently since then, the claim has been made that the world is "over-tonnaged" in ships. Nevertheless, the fact is that during the past six years the principal maritime nations have seen fit to increase the world's tonnage by some 1,300 ships of 8,000,000 tons, and these ships are all suitable for transoceanic service as none are of less than 2,000 gross tons. Of this number the United States has participated to the extent of 18 ships, totalling less than 200,000 gross tons.

There is but one conclusion to be reached in so far as it concerns world shipping being over-tonnaged. It is over-tonnaged—with obsolete ships.

Slow, irregular tramp service has been superseded by cargo liner service, and it is fully recognised that ships with speeds of from 12 to 16 knots are essential to this class of service, providing regular and frequent sailings and designed to meet the specific requirements of the trade in which they engage. The 2,314 ships of 13,636,967 tons, completed for account of the United States Government, have an average sea speed of less than 10 knots and none of them were built to meet the requirements of any particular service. From this material were selected the ships used in the pioneering stages of establishing services in highly competitive trades. And America's competitors not only had the benefits accruing from the use of modern ships, but also the advantages of long experience in these services. Notwithstanding these obstacles, progress has been made in the inauguration of American services where none existed. This course has been justified by the fact that American foreign trade has expanded rapidly in the trade areas served by ships of the American flag.

Shipowning Benefits American Trade

The benefits of American flag services are obvious, as the growth of trade with South America demonstrates. In 1914 only five United States vessels were in service between the United States and ports in South America. One of these ships was a combination passenger and freight carrier and the others were cargo carriers. The combined gross tonnage of the five vessels was 22,741 tons. In 1914 the value of the imports from South America was $222,677,000, and of the exports $124,540,000, a total trade of $347,217,000. In 1920 and succeeding years seven lines operating South American services were inaugurated by the United States Shipping Board. Forty-five vessels, aggregating 343,825 gross tons, were allocated by the Board to these South American services. Privately owned American lines have also established South American services and on June 30, 1928, there were 89 United States ships of 535,140 gross tons

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employed in South American trade routes. This total includes 35 Shipping Board vessels of 161,472 gross tons which are still engaged in South American trade. The effect of this influx of American flag vessel tonnage is evidenced by the fact that the imports of 1921 were valued at $295,623,000, and the exports at $273,325,000, an increase of $221,731,000, nearly 64 per cent. over the value of the total trade of 1914. The earliest available cargo tonnage figures covered the year 1921, and it is noted that the water-borne commerce with South America in that year included imports of 2,217,226 tons and exports of 3,143,735 tons, a total trade of 5,360,961 cargo tons. The South American trade of 1927 was in value approximately $1,000,000,000, in cargo tonnage, approximately 13,000,000 cargo tons and constituted 13 per cent. of the entire water-borne foreign commerce of the United States in that year.

Far East Trade Developments.

The development of foreign trade in the Orient further illustrates the influence of American ships in the increase of trade. Prior to the World War the only vessels of the American flag in the trade with Asia were those of one line operating out of Pacific Coast terminals. The average annual value of the foreign commerce of the United States with Asia during the five-year period 1910 to 1914 was less than $380,000,000. Following the World War, seven lines were established by the Shipping Board to operate on routes to Asia. Three of these lines, having terminals on the Atlantic Coast, operated 43 vessels of 314,300 gross tons, and four lines, operating from the Pacific Coast, employed 39 vessels of 313,230 gross tons, a total of 82 ships of 627,530 gross tons. The value of trade with Asia in 1927 was more than $1,800,000,000, an increase of nearly 380 per cent.; and there were on July 1, 1928, 140 American flag vessels of 1,036,193 gross tons operating in the Oriental trade.

Precisely similar developments are noted in records of trade with Africa. Prior to the War there were no American ships sailing to that Continent, and the average annual trade during the five-year period 1910 to 1914 was slightly more than $47,000,000 per year. The Shipping Board during 1922 and 1923 inaugurated two lines, one to South and East Africa, the other to West African ports. Fifteen ships of 82,400 gross tons were assigned to these trades. The trade of the United States with Africa during 1927 was valued at over $200,500,000, an increase above the 1910–1914 average of 325 per cent. There are now employed in African services 19 American vessels of 107,549 gross tons.

These figures indicate that the influence of American ships on the world's trade routes is a decisive factor in the expansion and development of United States foreign trade.

Foreign Ships in American Trade.

What has been accomplished under the most trying circumstances is an indication of what the future holds forth for American shipping

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in foreign trade when it replaces its obsolete ships with modern tonnage, in which the United States at the present time is outclassed by all of its competitors. The United States has become one of the world's greatest exporting nations. In 1927 the total United States water-borne foreign trade amounted to 113,000,000 tons, valued at approximately $8,000,000,000, and the freight bill for transporting this commerce reached $760,000,000. Thirty-three countries, with a total of 5,700 ships of over 26,000,000 gross tons, participated in the carriage of the United States foreign trade. Of this number, 4,025 foreign flag vessels of 19,000,000 gross tons carried more than 66 per cent. of this overseas trade. More than 20 per cent. of these vessels have been built since 1921. 1,675 American vessels of 7,000,000 gross tons carry less than 34 per cent. of the entire foreign trade. Less than four per cent. of these vessels have been built since 1921.

Trade Divisions.

American foreign trade is usually described under three geographical divisions: Overseas Trade, Near-by Trade, and Great Lakes Trade. The overseas trade includes commerce with the east and west coasts of South America, and transatlantic and transpacific countries. Near-by trade includes commerce with Atlantic and Pacific Canada, Mexico, Central America, West Indies, and the north coast of South America to, and including, the Guianas. The Great Lakes trade is chiefly confined to commerce with Canada on the Great Lakes.

In the overseas trade approximately 70,000,000 tons are transported annually, with an average cargo ton value of $95·00. The average cargo ton value of imports in this trade is $182·55, and the average cargo ton value of exports is $66·20. Of this overseas trade, which constitutes nearly 62 per cent. in tonnage volume and 80 per cent. in value of the entire United States water-borne foreign commerce, vessels under the American flag carry less than 30 per cent. of the imports and less than 19 per cent. of the exports. In the near-by ocean trade, which constitutes more than 26 per cent. of the tonnage volume of the entire United States water-borne foreign trade, American vessels carry approximately 56 per cent. of the imports and 52 per cent. of the exports.

In the Great Lakes trade with Canada approximately 13,000,000 tons are transported annually, amounting to more than 11 per cent. of the total United States water-borne foreign commerce. American vessels carry two-thirds of the imports and 40 per cent. of the exports. The average cargo ton value in the combined near-by and Great Lakes trades is $30·00. The average cargo ton value of imports in this trade is $26·12, and the average cargo ton value of exports is $37·44.

The figures revealed demonstrate very definitely that the flow of high-priced commodities gravitates to the modern types of ships. This is best illustrated in the overseas trade, where American ships carry less than 30 per cent. of the imports and less than 19 per cent. of the exports, where the values are over 200 per cent. higher and the

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volume 60 per cent. greater than in the combined near-by and Great Lakes foreign trades.

In 1926 a thorough survey was made by the United States Shipping Board throughout the country to aid in determining a shipping policy. The opinion was unanimously in support of an adequate American merchant marine, privately owned if possible, Government owned if necessary—however, in any event, an adequate American merchant marine. At a meeting held at the offices of the United States Shipping Board in Washington in the early part of 1928, where the shipping interests of the United States were fully represented, they said :

"We believe that the Shipping Board, in the face of serious obstacles, has done its best to carry out the Merchant Marine Act of 1920. But we further believe that a crisis has been reached and that the future of the American merchant marine now depends upon prompt constructive action by Congress. This action should look toward reconditioning some of the present fleet, and should otherwise provide inducements having in view its early transfer to private ownership under conditions assuring continuance of operation. Whatever Congress may do along this line will be unavailing unless it provides a way by which private American citizens will be enabled to own and operate modern ships in the ocean-carrying trade of the world in competition with citizens of the other great maritime nations."

The whole-hearted support of the American people toward retrieving their shipping culminated in the passing of the Merchant Marine Act, 1928. The primary helps to American shipping in this Act are the loaning of Government money for new construction at low rates of interest and increased compensation for carrying foreign mails in ships of the American flag.

America's participation in the World War, with its resultant awakening of nationalistic spirit, and particularly the disclosure of its weakness on the seas and the heavy price it has paid for smug complacency, when brought before the people in the survey of 1926 revivified the latent pride in ships that had been dormant in the minds of Americans for so long. It brought into being the conviction that never again would they allow themselves to be without weapons, without ornaments, without strength, without pleasures, without defence, or without profit, as typified in ships.

A Summary of America's Attitude.

The present-day attitude and views of the United States of America towards ships and shipping can well be summarised as follows :

That the best interests of the nation require the possession and maintenance of an adequate merchant marine, American built, American owned, American controlled, and American operated.

A first-class commercial and maritime Power cannot occupy and maintain its position without its own ships.

That the many thousand millions of dollars loaned its competitors for their rehabilitation directly and indirectly has aided them in the strengthening of their sea-power and the time has now arrived for Americans to strengthen and enlarge their own sea-power.

Activities in American shipyards will be reflected throughout the entire country. Labour and materials used in the construction of

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ships come from all sections of the country, with consequent employment and greater purchasing power to the nation as a whole.

With the strengthening of existing services and the establishment of new services with modern passenger and freight ships, designed to meet the specific requirements of the routes on which they operate, America can look forward to a steady and healthy growth in its international trade.

When it reaches the point where it carries a fair portion of its commerce in its own ships, the annual monetary gain to the nation will amount to 250 million dollars based on the present volume of foreign trade.

The nation industrially will benefit by the addition of modern transportation facilities, stabilising ocean transportation rates, holding them at a reasonable level, and making possible on a wider scale American success in foreign markets.

In considering the relative strength of navies the fact must not be lost sight of that a navy is only as strong as its right arm, its merchant marine.

That the Washington Arms Conference sought to establish naval ratios, and in so doing brought world attention to the value of merchant ships as an element in sea-power, which is the sum-total of the offensive and defensive strength of a nation upon the seas.

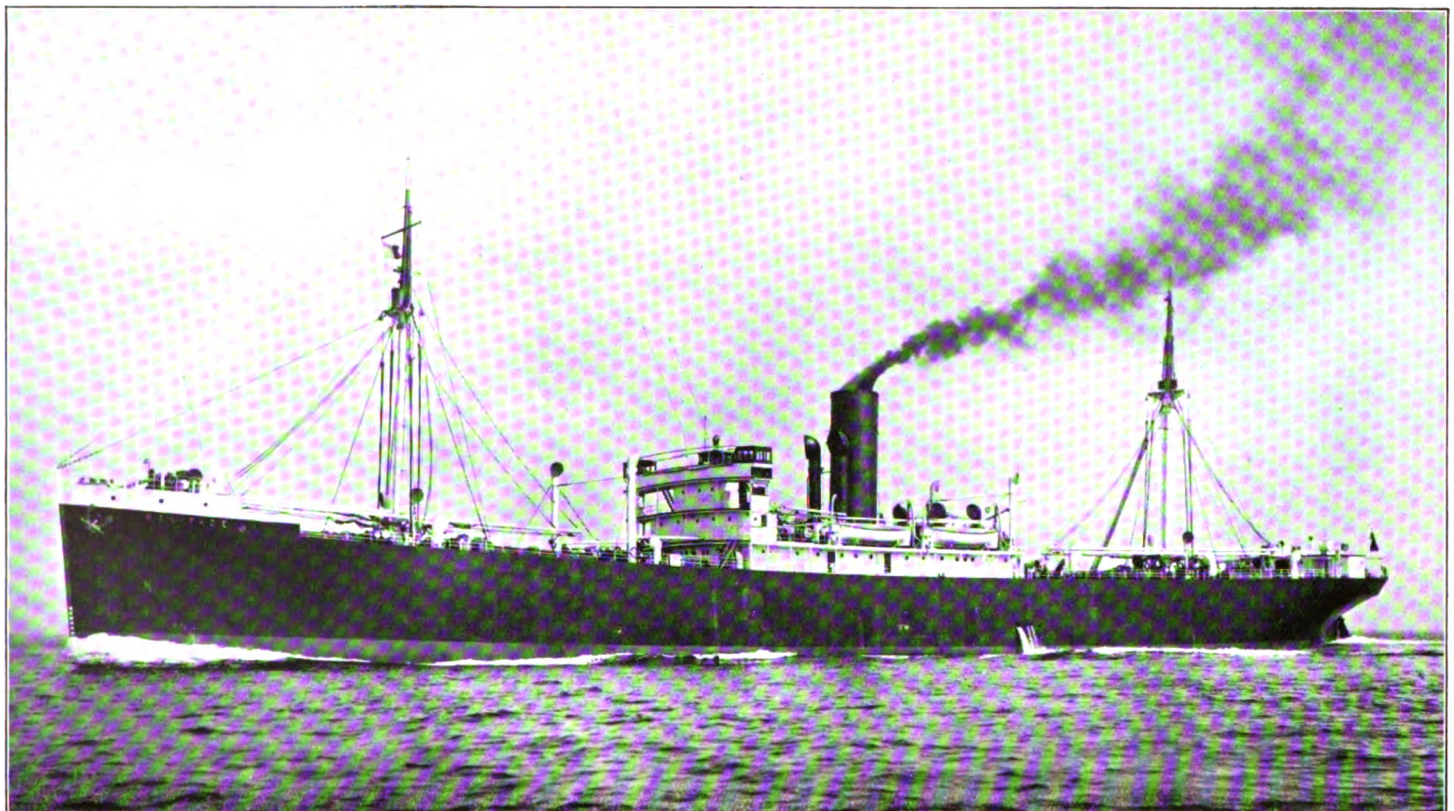
And finally, the American people now recognise that in a national emergency it is the combination of navy and merchant marine that totals sea-power, the value of which cannot be translated into dollars and is WITHOUT PRICE.

ALFRED H. HAAG,

Director, Department of International Shipping, Georgetown University, School of Foreign Service, Washington, D.C., U.S.A.

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BOOTH LINER BONIFACE. FIRST BRITISH-BUILT VESSEL WITH BAUER-WACH INSTALLATION.

(Built by R. & W. Hawthorn, Leslie & Co., Ltd. Bauer-Wach installation by Swan, Hunter & Wigham Richardson & Co., Ltd., Wallsend-on-Tyne).

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CHAPTER XVII.

Marine Machinery.

In the past it has not been unusual to deal with the subject of marine machinery as a description of a competition between various types, and particularly as between steam and motor prime movers; the advocates of each system sometimes took the line that their choice was the only possible one. To-day the position has changed. It is realised that there are fields where each is supreme. A considerable area intervening may well be covered by either type, and special cases naturally merit detailed consideration before a final decision can be arrived at.

The year past has seen no diminution of effort technically to attain to greater efficiencies all round. In fact, it would be difficult to challenge a statement that no year has seen greater progress and development. It has to be recorded also that this achievement has been reached in the face of unfavourable economic conditions. Orders are not yet plentiful and prices are very keenly competitive and often unremunerative.

It may well be that the scarcity of orders for new tonnage has acted as an incentive to the engineer to develop his machinery in respect of economy of operation, low cost of production, and in general attractiveness in order to induce work by fostering demands for new construction. Such rapid progress as is being made, however, brings in its train considerable risks of heavy financial losses should the results fall short of anticipation; and a meed of praise must be given to all those who undertake to pursue the path of progress in matters of marine engineering.

Important Steamers.

To assess the present position as recorded in Lloyds Register, steam tonnage represents some ninety per cent. of the total vessels afloat of 100 tons and upwards, and it has been postulated that had the steam engine been given a fraction of the intensive technical study, and of the costly and protracted large scale experiments that have been applied to the internal combustion prime mover, the position of the motor-ship would not have been as strong as it is to-day.

The two new German transatlantic liners, which but for the strike in the shipbuilding industry there would have been commissioned in the spring of 1929, the Bremen and Europa, are

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the most notable vessels building, inasmuch as they are designed to recapture the Mauretania's long held transatlantic record. These vessels have water-tube boilers with a high degree of superheat, and work at a pressure of 310 lbs. per square inch. The propelling machinery consists of twelve single reduction geared turbines driving four shafts.

Of the steamers completed during the year the Duchess class of the Canadian Pacific Steamship Company—the Duchess of Bedford and the Duchess of Atholl, built by Messrs. John Brown & Co., Ltd., of Clydebank and Messrs. Wm. Beardmore & Co., Ltd., of Dalmuir, respectively, are undoubtedly the most important.

The Empress of Australia, belonging to the same owners, converted to single reduction gearing and modern auxiliaries—some electric driven from Diesel generators, which re-commissioned from Messrs. Fairfield's yard in 1927—gave a clear indication, even with normal pressure Scotch boilers, of the overall fuel consumptions that might be expected by taking advantage of modern improvements in steam engineering, in the boiler rooms by means of air preheaters, superheaters, and careful lagging, and in the engine-room by modern three-stage turbine design with end tightened blading in the high pressure units and modern auxiliaries. The Duchess class have given the additional theoretical improvement with water-tube boilers, working at a pressure of 375 lbs. per square inch, the higher steam temperatures so made possible of attainment and more electric auxiliaries consequent upon the increased capacity of Diesel generator sets installed. The figure of consumption is 0·60 lb. of oil fuel per s.h.p. per hour for propelling purposes and 0·64 lb. for all purposes with boiler oil, as against 0·40 lb. with Diesel oil which would be reached with a similar motor-ship. These figures indicate how the margin between the two systems is being narrowed. The means adopted with these installations to ensure perfectly pure feed-water for the small tube water-tube boilers have been fully described elsewhere. This performance in respect of fuel economy marks the highest attainment in overall propelling efficiency with steam machinery at sea attained to date.

It has been arranged that two post-war passenger ships of 18,000 s.h.p. of the same owners, the Montcalm and the Montclare, be converted from double to single reduction, to conform to the same leading technical requirements and to give similar results as the Empress of Australia already mentioned. These vessels will not have new boilers.

The new Canadian Pacific Company's liner the Empress of Britain, building by Messrs. John Brown & Company's yard, Clydebank, is to have similar plant to the Duchess class except that the boiler pressure is raised from 375 to 425 lbs. per square inch. The total power will be 60,000 s.h.p. developed on four shafts, the centre shafts each delivering 20,000 s.h.p. at 150 r.p.m., and the wing shafts arranged for ahead running only will each give 10,000 s.h.p. at 200 revolutions. This vessel will be of the " de luxe " type for the Atlantic trade, and for cruising purposes, when only the centre shafts may be used.

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The Empress of Japan, building by Messrs. Fairfield, is to have similar machinery, but with twin screws of a total of 31,000 s.h.p., also with water-tube boilers and single reduction geared turbines.

Steam Electric Propulsion.

A novel departure is the P. & O. liner, the Viceroy of India, due to go on trials in 1929, into which two turbo-alternators, delivering current to motors on the twin screws, are being installed. The boilers are of the Yarrow type, generating steam at 375 lbs. per square inch pressure. The total power is 17,000 s.h.p. The turbo-alternators and motors were built by the British Thomson Houston Co. of Rugby. This vessel is designed to have two economical speeds, and, to this end, the turbo alternators are so proportioned that maximum steam economy will be achieved at both speeds of ship. This electrical system will have the advantage of silence of operation, no gearing being present. It may be stated, however, that modern single reduction gearing truly cut in carefully maintained hobbing machines is extremely satisfactory from the point of view of silence. The absence of astern turbines, the ease of electric control for manœuvring, the steady steam condition with constantly running turbo-alternators and the safety with which high superheat can be carried, all will contribute to a low steam consumption rate.

Experience will prove whether these advantages outweigh the not negligable electrical losses. It is not seen how the first cost can be less than the competitive geared steam turbine system, and it must remain doubtful, in the light of all the experience to date with steam electric ships, particularly those of American origin, whether any gain in overall fuel consumption can be anticipated.

It is known that another well-known British shipowner is contemplating ordering a combined passenger and cargo moderately powered vessel for the Indian trade, with steam electric propulsion, the steam generators being of the Ljungstrom type—which system offers certain very defined advantages for vessels of this type. It will be seen that the interest in the electric system is still keen and it remains only to be proved whether the advantages outweigh the additional cost at any rate for normal powers.

The New British Atlantic Passenger Vessels.

Based on the foregoing the decision regarding the new 1000 feet British Atlantic liners has to be made—one is now under construction—and the final choice which must be made at an early date will be awaited with the keenest interest. It has been officially announced that the propelling means will be electric, but whether Diesel or steam electric is not yet stated. The requirements of speed will demand a power of the order of some 160,000 s.h.p. If Diesel generators be decided upon as the main power generators a very large number are obviously called for, but as will be gathered from a perusal of the section of this chapter dealing with the Diesel engine this problem cannot be regarded as in any way insuperable.

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The advantage of fuel economy with Diesels, taking cognisance of the somewhat lower cost per ton of the slightly less refined boiler oil with which the boilers would be fired, applicable to the North Atlantic trade, cannot be great, inasmuch as large turbo alternators have been developed to a very high thermal and overall efficiency, and it seems to be generally accepted, somewhat hastily it may be, that the power involved and the colossal financial risks involved in the event of any lay-up of the ship, definitely preclude very serious consideration being given to single reduction geared sets, although naval practice recently shows the possibility in this direction. 40,000 s.h.p. per shaft, assuming as no doubt will be the case a four-shaft arrangement, involves a power of 13,300 s.h.p. per pinion, three pinions driving each main gear wheel. Such powers involve large gear wheels, and the question of the limiting peripheral speed permissible arises. Hence the final decision as to the type of machinery cannot be reached without very serious consideration, but will be awaited with the keenest interest, and will be governed, no doubt, primarily, by a consideration of the financial losses which would accrue, should lack of reliability cause any suspension of operation.

The Future Developments of Turbine Steamers.

In respect of the future possibilities with turbine steamers, what prospects are there for early further developments?

It is not readily seen wherein any great improvement in overall thermal efficiency with oil firing can be looked for. In every stage of the transformation efficiencies approaching the maximum possible are being attained. Rather should effort be concentrated in the direction of decreasing the amount of space occupied for steam generation in the boiler rooms. Increasing the passenger space available, from the point of view of the earning capacity of the ship, is equivalent to a saving in fuel consumption, and it is put forward as a definite statement of future policy that the foregoing is the most hopeful avenue or progress at the present time and in the state of the art to-day.

Coal-Burning Steamers.

These remarks refer exclusively to oil-burning steamers. It is interesting to record that developments are now taking place to give to coal burning some of the advantages of oil burning, by way of the development of systems for the combustion of pulverised coal. To a very fair degree the same flexibility of control as with oil burning is available. Lower grade fuels can be successfully consumed. The nicety of the control of the air and fuel supplies with the latest types of pulverising plant permits of higher boiler efficiencies being attained. In America, and to a lesser extent here, this system of coal burning has been developed for land power stations. The American ship the Mercer has given encouraging results at sea. The Blue Star vessel Stuart Star has had one single-ended boiler converted to the Clarke Chapman system, and the success achieved has justified

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the conversion of the four double- and two single-ended boilers to the system, which is now proceeding.

A new collier, being built on the Clyde, is to have pulverised fuel burning, being, it is believed, the first new vessel to be built for this system of combustion.

Coal is our national fuel and one of our greatest assets. It therefore should fall to the lot of British engineers to foster this system to the utmost. Full development should bring coal more directly into competition with oil, as many of the most important subsidiary advantages of oil burning afloat are obtained with powdered solid fuel, and the fuel costs with coal are of course less than with oil on most of the trade routes. It is yet too early to predict with certainty, yet there can be little doubt that there is a great future for the system of pulverised coal burning.

The greatest development during the year 1928 in the case of the machinery of vessels of average power is the large number of steamers which are having the Bauer-Wach exhaust steam turbine plant fitted. No further reference need be made here to this system as a special chapter by Dr. Bauer, the joint patentee and the leading engineer of the licensor parent company, is included in this volume—see pages 201–210.

The Motor-Ship.

To turn to the question of the motor-ship. Of new tonnage, building at the present time the world over, in gross tonnage, motor-ships total over a million and a half gross tons, as against steamers a million and an eighth. The horse-power of Diesel engines under construction is nearly double that of steam reciprocating and turbine engines combined.

In respect of the type of fuel, it is interesting to note that of the new steamers, classed during the current year, over 40 per cent. in tonnage were fitted for burning oil fuel. In connection with the clash of types of propelling machinery, as distinguished by the type of fuel consumed particularly, certain definite tendencies are now strongly marked. For transatlantic passenger vessels and freight carriers to all parts of the world where oil fuel is relatively cheap, the preponderating advantages in favour of oil—cleanliness, ease of bunkering, high calorific value, reduction in personnel and so forth—are such that the liquid fuel is gaining in popularity at sea. And, of course, with the exception of large-powered transatlantic liners, the Diesel engine, requiring only from half to a third of the quantity of the liquid fuel of low-powered steamers, is the only type of propelling machinery being considered by the majority of progressive ship-owners to-day. The exception is the tramp, where uncertainty regarding the fuelling stations at which the vessel will call, the varied nature of the duties performed, and the very large extra first cost of the Diesel engine, cause the steam reciprocator to remain the favoured type of propelling plant, and as already stated, particularly so when associated with the Bauer-Wach exhaust turbine system referred to elsewhere.

It is a remarkable development indeed that the Diesel engine is

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being applied to so many large Atlantic liners and other similar important vessels, and in the last detailed returns available it is significant that of all vessels of over 8,000 tons, building at the present time, only 7 are to be equipped with steam engines and 31 with oil engines. Over 10,000 tons gross the figures are 4 steamers and 20 motor-ships. Therefore for the largest class of ships under construction the motor engine is definitely favoured at the present time.

There is still no finality as regards the most suitable type of Diesel engine for marine propulsion. For powers up to 2,000–3,000 s.h.p. per shaft the four-stroke single-acting engine motor still holds the field. Of the 189 motor-vessels built in 1928, four-cycle single-acting machinery is installed in 100; four-cycle double-acting machinery in 4; two-cycle single-acting in 73; and two-cycle double-acting machinery in 12. In vessels under construction to-day the ratios do not differ greatly except that there is a greater percentage of four-cycle double-acting machinery.

Experience at sea, however, with the solid or airless injection of the fuel has indicated that the difficulties earlier associated with this method, due to the absence of the cleansing and cooling effect of the high pressure air blast for injecting the fuel, and the difficulty of adjusting the atomising devices to deal satisfactorily with various qualities of fuel, have been overcome, and this method of injection and this simplification may well become the standard at an early date.

Double-acting Engines.

As giving desirable saving in space and weight the double-acting engine is still finding favour, and an increase in number of double-acting engines have been put to sea, and are under construction at the present time. This type of prime mover has always been favoured in Germany, to which country the Diesel engine owes its inception, and steady progress has been made there and in this country.

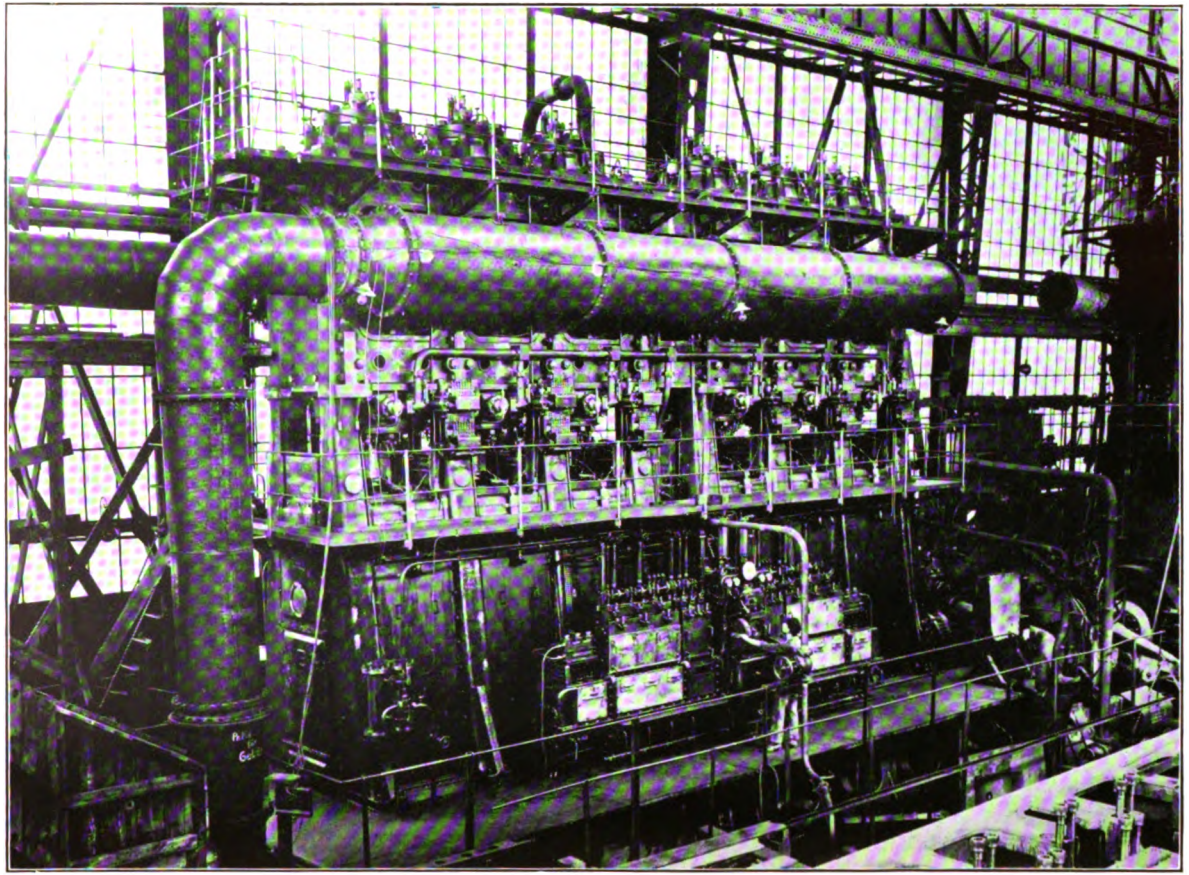
The earlier history of the double-acting two-cycle Diesel engine was of heavy difficulties and often of failures. Inasmuch as this type represents the highest power output from a given mass of material and volume of space occupied naturally the problems of heat transmission are a maximum, and there is the further difficulty with the piston rod and its stuffing box. The success that has been achieved by some of the examples now at sea would tend to demonstrate that improved technique, rapidly growing experience, and the availability of improved materials and castings have pointed the path towards successful performance.

The M.A.N. engined motor-ship Augustus, with which, at the commencement of its service, piston rod trouble was experienced, is, so far as can be learnt from information now available, performing very reliably and economically, and with a change of propeller the engines are giving quite a good power output. Success has been achieved also with M.A.N. engined German vessels, fitted with similar machinery, developing approximately 1,000 i.h.p. per cylinder, in six-cylinder sets.

The largest double-acting engine in operation is the Diesel engine

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A.E.G. HESSELMAN DOUBLE-ACTING, TWO-CYCLE, MARINE DIESEL ENGINE 4,500 B.H.P.

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driving a dynamo for peak load output in the Hamburg Electricity Power Station. This set develops at full power 15,000 b.h.p. in nine cylinders.

A new design of great interest is the A.E.G. Hesselman engine, shown on the opposite page, of a full-power output of 6,000 b.h.p. at 120 r.p.m. The first set of this type would have been now at sea but for the recent strike in Germany. This engine, sponsored by engineers versed in oil engine technique, is extremely promising. It has no camshaft and the minimum of valves ; a single fuel valve and a relief valve in the top cylinder cover, and fuel valve and starting valve in the bottom cylinder head. The arrangement for cooling the surfaces exposed to combustion is extremely well thought out—an essential with large engines where the fuel combustion rate per unit of surface is of necessity high, due to the large power output per cylinder.

The fuel pumps are driven directly from the crankshaft by skew gearing, so timed that the injection takes place automatically through the spring loaded fuel valves or injectors into the combustion spaces, top and bottom. A very considerable amount of clever research by the makers into the various phenomena of fineness of fuel spray, penetration, distribution of the fuel into the available combustion supporting air, and the phases of scavenging proceeded the construction of an experimental single cylinder unit. The results of this work were given in a paper read by Dr. Sass before the Institution of Marine Engineers last session.

Foreign efforts are not unchallenged at home, and the Richardsons Westgarth engine also following the desirable principles of the two-stroke cycle, double-acting in operation with 3 cylinders 21¼ inches diameter, 38 inches stroke, with solid injection of the fuel is the first British example of this type. The first engine is designed to develop about 1,250 b.h.p. at 90 revolutions in service, and is now running bench trials and will be put into service early in 1929. These engines will attract keen attention, and all who have the interests of British engineering at heart will hope for the success which such a bold policy undoubtedly deserves.

When mentioning double-acting engines, the foregoing examples as representing the latest ideas on the subject have been dealt with first, but it should be stated that of all the double-acting Diesel engine construction now going forward the Burmeister & Wain double-acting four-stroke cycle engine represents half, at least, of the construction. On the Clyde, in Belfast, Copenhagen and Trieste, a number of large sets of 1,000 i.h.p. per cylinder are under construction. Many of these are repeat orders, auguring the success of the pioneer vessels so engined.

Mention might be made of the most unfortunate accident which occurred in the engine room of the Kungsholm, the sister ship of the Gripsholm. In the light of the very full and authoritative reports which have been published it is now clear that this explosion could have occurred within any enclosed crank-chamber. A closed crank-chamber is, of course, a feature common to all modern Diesel engines. This unfortunate occurrence therefore is in no way what-

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soever connected with the type of prime mover involved. It is well that this should be made entirely clear, as such mishaps are often liable to misinterpretation and to the deduction of false conclusions.

The principle of double-action is well established, and for certain classes of ships of considerable power has advantages. Nevertheless, it must be stated that in the case of a number of the high-powered motor vessels engined with double-acting Diesel engines of various types the speeds of the vessels have not always quite come up to the owner's expectations. Experience has dictated the prudent policy of limiting the mean effective pressure in the cylinders, the quantity of fuel burnt, minimising the heat stresses, and so restricting the power output rather than risking the incurrence of prohibitive expenses at the terminal ports for overhauls and renewals. As in most engineering matters the best policy is a compromise between maximum output from a given mass of material, and so maximum stresses and the minimum necessity for frequent renewals and overhauls.

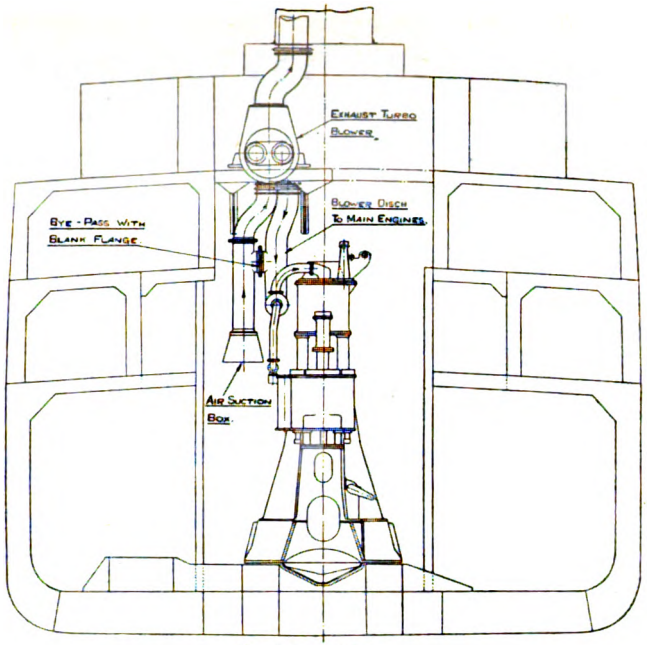
The protagonists of the two-cycle principle are increasingly in favour of a very low rating of engine and low heat stresses incurred twice as often, being two-stroke cycle, as with the four-cycle engine, and have undoubtedly received great encouragement from the news that the erstwhile strong adherents to the four-stroke cycle engine, Messrs. Burmeister & Wain of Copenhagen, are building a two-cycle double-acting set for a definite order, after having carried out a number of experiments on a single cylinder unit at their Works.

Supercharging.

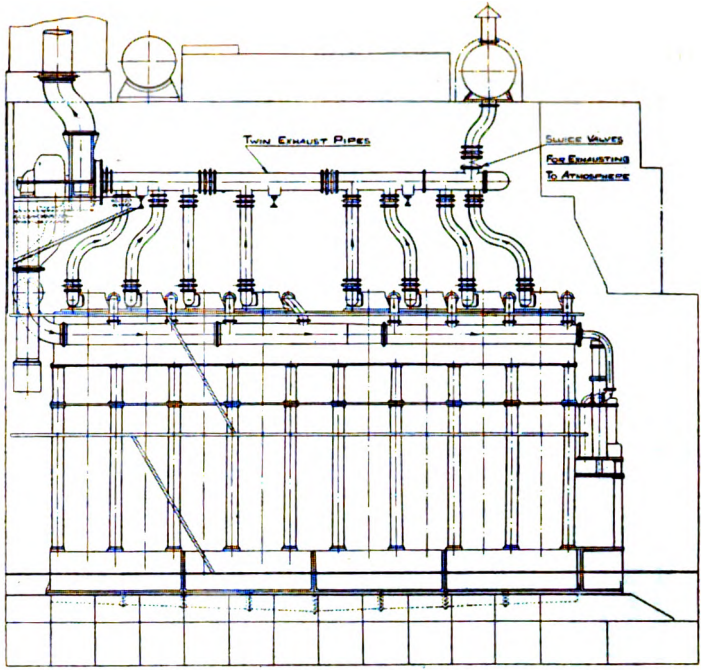
To revert—the four-cycle single-acting engine remains the standard, and just when the two-cycle and double-action was encroaching on its ground a new development—that of supercharging—appears. The basic idea is not new, nor are schemes for utilising the energy in the exhaust gases, but Ing. Büchi, a Swiss engineer, has developed the system that goes by his name, which fulfills both these aims. To utilise exhaust gases for steam raising has often been successfully applied, but unless the heat is abstracted near the source, *i.e.* near the combustion space, and through the medium of the piston, as in the Scott-Still engine, the amount of heat recovery and steam raised is small and is often not regarded as being worth the extra expense and complications involved. With the Büchi supercharging system the exhaust gases are diverted into a turbine, which is direct-coupled to a blower, which supplies the air under pressure to support combustion in the working cylinders.

Supercharging means extra air for combustion. The more air present in the engine cylinders the greater the quantity of fuel that can be safely consumed, and so the greater the power output obtainable. If this result can be achieved without any substantial increase in the maximum pressure in the cylinder then the main framing and the principal running parts of the engine will not carry any higher loads, nor be more highly stressed, but will simply be loaded for a greater percentage of the time of revolution or of the cycle.

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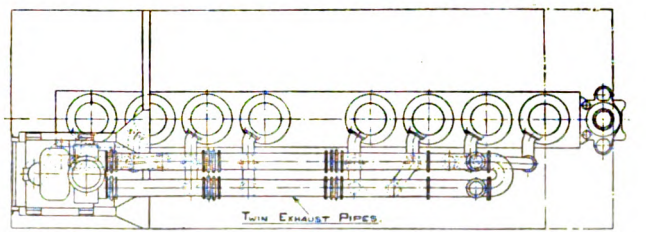


View Looking Aft



View Looking To Port

Arrangement of Exhaust Turbo Charging Installation on the Buchi System for M/V "Raby Castle"



Plan View

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Experimenters in thermo-dynamics for the last decade have aimed in this direction, and naturally so, when it is considered that with the average four-cycle Diesel engine a stress corresponding approximately to the maximum is carried for only a sixth to an eighth of the total revolution or cycle.

By a combination of new timing to the induction and exhaust valves, and the introduction of air coolers between the blower and the engine with the Büchi system, it is arranged that the maximum pressure is kept reasonably constant, and the large increase in the volume of air forced into the working cylinder from the blower supports the combustion of extra quantities of fuel, so giving a greatly increased power output from a given standard size of engine when fitted with an exhaust gas driven turbine and blower.

If the shafting be designed for the increased turning moment so obtained, a very great increase in power is available in this way, up to possibly a maximum in service of 50 to 60 per cent. So much for the question of supporting combustion, and increasing mean pressures and loads without substantial augmentation of the maximum stresses, but it will be conceded that the temperatures of the surfaces adjacent to combustion is an equally important question. The first British motor-ship to go to sea with this system, the Raby Castle, was engined by the North-Eastern Marine Engine Works, with single-acting four-cycle Diesel engines developing 3,000 i.h.p., and went into commission three and a half years ago. Quite recently the Büchi system has been added by these engine builders, who are the first British licensees of this system, to this most successful motor-ship. The principles of this system will be seen from the illustration on page 197.

A comparison of the results then and now shows that the maximum pressure of the cylinders has only increased from 572 to 596 lbs. per square inch, the exhaust temperature little increased, and the speed of the ship on a slightly greater displacement increased from 11·9 knots to 13·334 knots. A new propeller was fitted to take advantage of the increased mean pressures developed in the main engines. It is understood that in service the increase of speed has been well maintained. One very interesting feature of the system is that it is automatic, to the extent that when a large volume of high temperature exhaust gases are available a large volume of supercharge air is required, and *vice versâ*. Of course, careful attention has been given to the question of running the engines reliably without any supercharge, since during manœuvring periods the amount of exhaust gases available will be insufficient, and too intermittently delivered to develop sufficient speed of the blower to give any real sustained supercharging air effects.

A number of important motor-ships, including the new Holt vessels and the Florio fleet of Tosi engined four-cycle motor-ships, are being built for supercharging on the Büchi system, with shaft scantlings of sufficient magnitude to allow of the possibility of utilising the system to the fullest advantage that may prove beneficial in service. This development should serve to keep the simple four-stroke cycle type of engine in the forefront as the lowest in first cost of all

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the types, until such time as further developments in other directions again seriously challenge its position. In such way is progress made.

High Speed Diesels.

Before leaving the subject of marine Diesel engines, mention must be made of a new tendency away from the massive, relatively slow-running crosshead engine, single or double-acting, towards simpler and higher speed units. This tendency is marked in two directions. The Parkeston and Esbjerg with trunk piston engines will be remembered. The operation of these engines has given rise to the possibility of utilising this type for higher powers being adopted. The standard industrial internal combustion engine has, of course, trunk pistons. For marine work it has always been considered that the functions of taking the side thrust consequent upon the angularity of the connecting rod, and acting as an obturator for the high pressure gases in the cylinder, should be separated as with the crosshead engine.

The trunk piston, however, is an exceedingly simple arrangement. The wear of the cylinder liner has proved to be low. Lubrication of the piston presents no difficulties, and the consumption of lubricating oil need not be excessive. The fuel consumption will be no greater. Moreover, for passenger ships the head room saved is of the very greatest importance. Obviously also the trunk piston type of engine is less in first cost.

Therefore, for the new Pacific Steam Navigation motor liner building at Belfast, four shafts permitting of a fairly high speed of revolution, with ten cylinder trunk engines on each shaft operating with airless injection of the fuel, will be adopted. This is a most interesting and important development. This type of propelling plant is the antithesis of the large slow-running crosshead type, and will be commended by the naval architect anxious to keep as much space as possible available for passenger carrying and dividend earning. The reduction in the reciprocating masses possible should obviate the creation of objectionable vibrations, which has become so important a point with the modern discerning and discriminating travelling public.

Geared Diesel Engine.

To go one step further, the German engineers are favouring high-speed Diesel engines, geared to the propeller shafts. Two 16,000 ton, 16 knot, transatlantic liners for the Hamburg-Amerika Line, are to be so equipped—the St. Louis and the Milwaŭkee, and should be commissioned in 1929. These will be the most important vessels working on this system. The introduction of gearing, just as with turbines, permits of the speeds of revolution for the propeller and the main engines being chosen to suit each to the advantage of the highest overall propulsive efficiency with minimum space occupied and weight. In these ships the four six-cylinder double-acting M.A.N. engines run at 225 r.p.m., and the two propellers at 110 r.p.m.

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The interposition of a Vulcan hydraulic coupling between each engine and the pinion which it drives isolates the gearing from any shocks consequent upon the uneven torque of the Diesel engine, and a number of motor-vessels now operating successfully at sea—some for a number of years—have proved completely the efficacy of this form of connection between the Diesel engine and the propeller.

In combination with this geared system, where two or four, or even more engines can be coupled to one propeller, making possible the installation of a large horsepower per ship, the M.A.N. Company have developed a high-speed double-acting two-cycle engine, so that in this way the maximum power output for minimum space with Diesels can be attained, and it is claimed that such is the saving in materials with this type of plant that the overall machinery cost will also be attractive.

As an alternative there remains the Diesel electric drive, where a number of Diesel generator sets are installed to deliver electric energy to motors on the propeller shafts. A most interesting Diesel electric ship, the Brunswick, was completed in 1928 by Messrs. Scotts' of Greenock. The propelling machinery consisted of four 750 b.h.p. Carel-Ingersoll-Rand Diesel engines, driving B.T.H. generators. This ship, which has bridge control of the main propelling motors, has made several successful voyages. The same system has been adopted in America to some extent, and for tugs, undoubtedly, the electrical characteristics of this combination of plant give certain advantages to such a vessel in respect of the varying conditions of revolutions, speed of ship, and torque inseparable from towing work, which outweigh considerations of first cost. For special vessels of many types this system also is attractive ; especially so where there is the necessity for operating at widely varying speeds, or in cases where the load for auxiliary purposes is a large fraction of the total.

Sufficient will have been said to prove the contention that there remains an almost bewildering number of types of marine machinery. Each type, however much it may be broadly advocated by its protagonists in the early stages of its adoption, gradually proves to be most suitable for a somewhat limited field in which it gives its maximum efficiency. Considerations of head room, for instance, are of prime importance for passenger-carrying vessels, but are not at a vital in freighters, where simplicity and low first cost are the prime factors. Fuelling conditions and the cost per ton of coal and oil generally determine in association with interest, depreciation, etc., on capital cost, the choice between steam or Diesel.

Great strides are being made, and it will be conceded that the marine engineer deserves the encouragement and the only possible recompense of a wide demand for new tonnage, which he is endeavuoring to stimulate by rendering his past products obsolescent as rapidly as possible.

M.I.N.A.

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CHAPTER XVIII.

The Bauer-Wach Exhaust Turbine System.

It is generally appreciated, whatever may be the cause, that the possibilities of development of steam prime movers for the propulsion of ships have in the last decade not been as fully exploited as might reasonably have been the case and there is at the present time, the world over, a general desire to remedy past omissions in this direction and to explore every likely direction towards higher economies with the steam engine. The reciprocating engine, triple or quadruple expansion, and the steam turbine have each in their own field proved satisfactory, but, had there been less absorption of technical efforts, resources, and of available finances in the perfection of the internal-combustion motor, undoubtedly the steam engine would have been further advanced to-day, since there are many duties where coal firing is eminently suitable.

The subject of this chapter is the combination of the reciprocating engine with the turbine. The fundamental idea of utilising the steam leaving the reciprocating engine by passing it through a turbine, which works between small pressure differences, before it finally enters the condenser, is not new but was introduced shortly after the first application of the turbine itself, and between 1907 and 1914 a large number of important ships were fitted with such exhaust turbines. In these cases an independent line of shafting and a propeller was driven by the exhaust turbine, as it did not appear feasible in those days for both the piston engine and the exhaust turbine to work on the same propeller shaft, primarily on account of the characters of the torque developed by each being so entirely different.

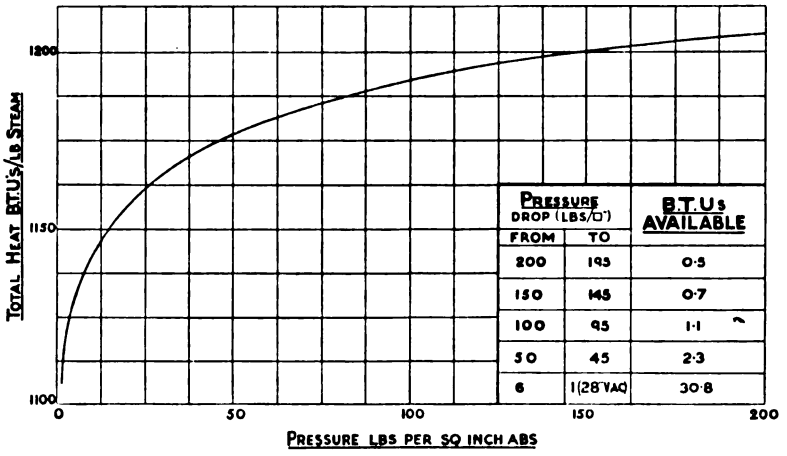
Consequently exhaust turbine ships had three or more propeller shafts, which limited this system to the propulsion of comparatively large vessels. It was not until several years ago that Dr. Wach and I took out patents which solved the difficult problem of combining the most uneven torque of the reciprocator with the almost perfectly even turning moment of the exhaust turbine, and the introduction of the system which is the subject of this chapter, and with which our names are associated, took place with great rapidity due to the success of the first installation. The North German Lloyd at Bremen fitted an exhaust turbine to the Elberfeld, and in the short period from January 1928 until February 1929 fifty such plants for new vessels and seventy-one installations for existing vessels, of which the total output of propelling machinery is 490,000 i.h.p., were completed or are under construction, proving the fact that the anticipated economic advantages of this combination were realised in practice to the full,

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and that the requirements of safety and simplicity of operation were met in every reasonable way.

Theoretical Basis of the B.-W. Exhaust Turbine.

The energy of a given quantity of steam expanding between certain pressure limits increases with the lowering of the level at which these pressure limits lie. For instance, the energy contained in 1 kg. of saturated steam, which expands from 15 to 14½ atmospheres is 0·4 metric calories, while expanding from 0·55 at. to 0·05 at. it is 22·7 calories. This feature is recorded over a good range by the curves below. It is therefore evident that the utilisation of the energy contained in steam expanding between 0·55 at. abs. (45 per cent. vacuum) and 0·05 at. abs. (95 per cent. vacuum) is fifty-seven times more economical than the raising of the boiler pressure from 14½ to 15 at. This exceedingly economical utilisation of steam energy is, however, not possible in the reciprocating engine,



as on account of the enormous volume of steam at such low pressures, low-pressure cylinders of infinite dimensions would be necessary. For this reason the piston engine is limited to an expansion ratio of 1 : 15. The steam turbine on the other hand can utilise expansion ratios up to 200, as it is driven by the energy of the steam flow and not, like the reciprocating engine, by the energy contained in a vessel, the steam cylinder. On this fundamental fact is based the immense advantage of the exhaust turbine.

From another point the combination of reciprocating engine and exhaust turbine is a particularly happy one, as the former, however inferior it is in the utilisation of low pressures, is superior to the steam turbine in the utilisation of higher pressures, especially for small and medium outputs. Here the steam turbine is at a disadvantage as on account of the small volume of high pressure steam, the production of reliable and economic blading presents great difficulties.

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The summary of the foregoing circumstances leads to the fact that for all steam pressures and temperatures the combined reciprocating engine and exhaust turbine is more economical in steam consumption to the extent of 18 to 30 per cent., an average of 20 to 25 per cent., than the reciprocator alone, if a good vacuum is maintained.

In the introduction it was stated that the Bauer-Wach exhaust turbine system, which combines the reciprocating engine and the exhaust turbine on one shaft, makes it possible to utilise the exhaust turbine for small and medium-sized steam installations. As the majority of the world's shipping consists of small and medium-sized installations then the economic value of this innovation is apparent.

Fundamental Principles of Construction.

As already mentioned, the problem which the inventors set themselves to solve was that of finding a technically sound solution for the combination of reciprocating engine and exhaust turbine on one propeller shaft.

For this purpose two important measures were necessary :

(1) The insertion of a coupling (clutch) between the exhaust turbine and reciprocator which possessed a sufficient slipping capacity to prevent the turbine masses which revolve uniformly with large inertia, being, so to speak, continuously drawn out of uniformity, by the irregularly working reciprocating engine.

(2) So to arrange the transmission of the power of the exhaust turbine shaft to the piston engine shaft that the impulses exerted by the pistons on the shaft would not gradually destroy the comparatively fine mechanism of transmission.

The solution of the problem was reached as follows : The exhaust turbine drives the reciprocating engine shaft through a double reduction gearing arranged aft of the engine, a hydraulic coupling of the Föttinger-Vulcan type is placed between the first and second reduction, and the main gear wheel is mounted on a hollow shaft which, together with the reciprocating engine shaft, forms a quill drive. The following descriptions of typical Bauer-Wach exhaust turbine designs illustrates these points clearly.

Typical Exhaust Turbine Plants.

The first example is that of the installations fitted on the cargo steamers Hagen and Bochum of the Hamburg-America Line, each of 9,500 tons d.w., and 13½ knots speed. Each vessel had triple expansion engines, with cylinders 800, 1,330, and 2,140 mm. diameter, with a stroke of 1,520 mm. The boiler pressure is 16 at. and the temperature of the superheated steam at the boiler, 300° C. The engines were designed for 4,400 i.h.p. at 72 revolutions. After the addition of B.W. exhaust turbine, at the same fuel consumption, the output was 5,400 i.h.p. at a corresponding increase of revolutions.

Fig. 1 shows the general arrangement of the engine with the

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exhaust turbine added. For the sake of clearness, the parts belonging to the exhaust turbine are brought out by heavier lines. From the low pressure cylinder A the steam passes through the exhaust steam oil separator B, which existed before the conversion, into a change-over valve C, which in one position conveys the steam to the exhaust turbine D, and in the other position, to the condenser. The power developed by the turbine is transmitted by the intermediate shaft E to the gearing F, which is connected with the propeller shaft G.

Further details of the exhaust turbine plant are illustrated by Fig. 2. The turbine is of the ordinary Parsons reaction type and runs

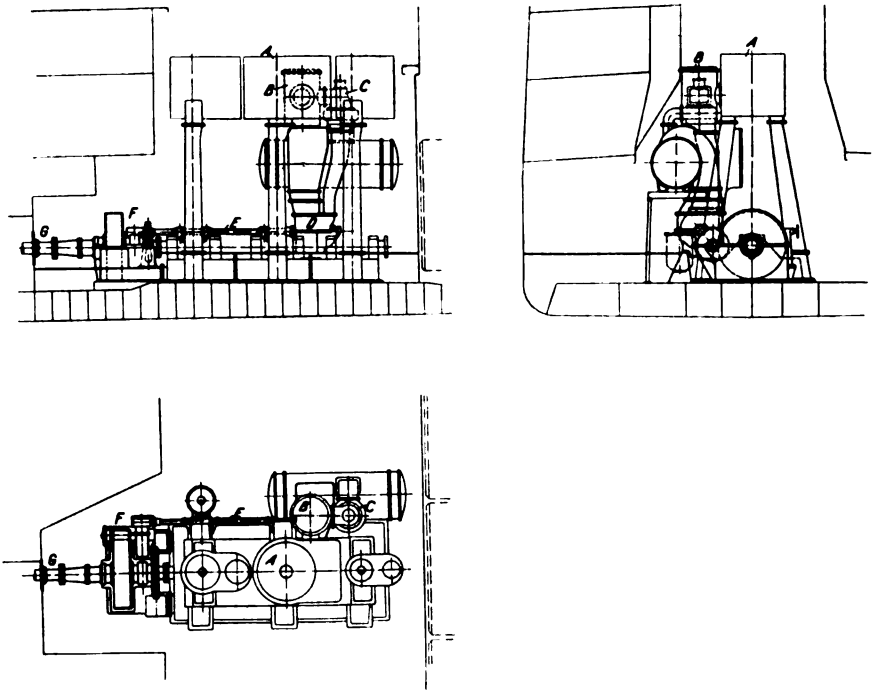


FIG. 1.—TYPICAL ARRANGEMENT OF B.-W. EXHAUST STEAM TURBINE PLANT AS APPLIED TO EXISTING INSTALLATIONS.

normally at about 3,000 revolutions. Here the exhaust turbine has been placed between the engine columns near the low-pressure cylinder and below the condenser in order to minimise the space occupied.

The gearing is of double reduction type and takes the place of the ordinary multiple-collar thrust-bearing, so that the additional space required for this part of the plant is very small. The work of the old thrust-bearing is taken up by a modern single-collar thrust-bearing W, the thrust ring of which is mounted on the inner shaft of the gearing. It is frequently possible to use the old thrust shaft, turning off all the thrust rings except one, which means a saving of costs of reconstruction.

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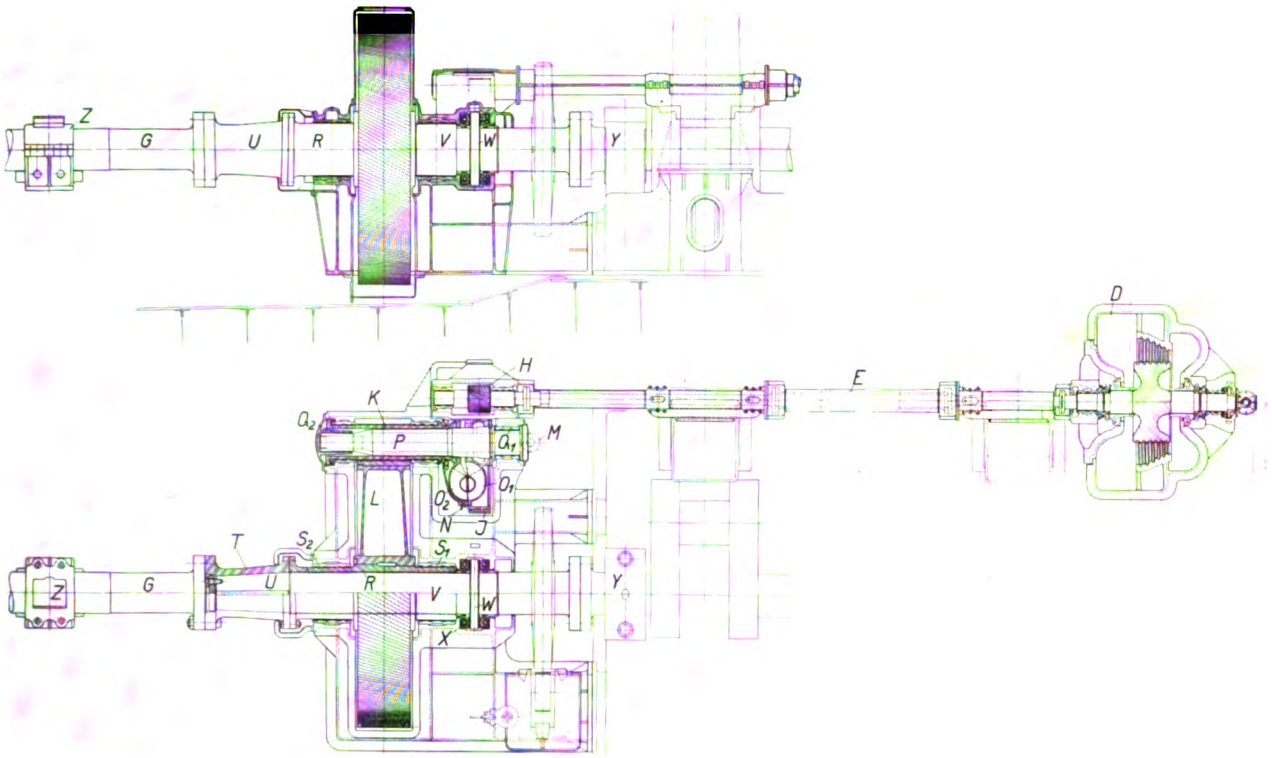


FIG. 2.—SECTIONAL ARRANGEMENT OF B.-W. TURBINE AND GEARING.

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The turbine power is transmitted by an intermediate shaft to the pinion, which engages in the gear wheel J of the first reduction. This wheel J is not rigidly connected with the pinion K of the second reduction, which in turn meshes with the main gear wheel L, but operates through a hydraulic coupling. This latter consists of two opposite cup halves O_1 and O_2 containing a number of single radial and axial blades which in their turn divide each half into a number of cells which, during operation, are filled with lubricating oil. Between the two parts, there is a clearance of 10 to 15 mm. The efficiency of the transmission is about 97 to 98 per cent., that is to say, the difference in the rate of rotation of both cups, the driving half O_1 and the driven half O_2, is 2 to 3 per cent. This difference compels the oil inside to rotate constantly through both cups and thus transmit the power. Torque variations are, however, not transmitted by the Föttinger-Vulcan coupling, with the result that the uneven torque of the reciprocating engine does not affect the exhaust turbine.

In addition to being a power transmission element, the hydraulic Föttinger-Vulcan coupling also serves as a manœuvring device as by simply letting the oil out of the coupling the exhaust-turbine is disconnected from the reciprocating engine, and thus from the propeller shaft. This can be performed in a few seconds and is always done when the piston engine is reversed, in this case automatically, as the emptying device of the coupling as well as the change-over valve are operated by the reversing shaft of the reciprocating engine. During astern running, therefore, the exhaust turbine is out of action and the steam from the piston engine flows direct to the condenser.

It is also possible, if the reciprocating engine breaks down, to disconnect the crank-shaft flange and run with the turbine alone with about 40 per cent. of the original power, by connecting up the turbine to the live steam pipe line.

As shown by Fig. 2, the further details of the gearing are as follows: The driving half of the coupling O_1 is incorporated with the gear wheel J and is thus mounted together with the latter on the shaft P which revolves in the bearings Q_1 and Q_2. The driven half of the coupling O_2 is flanged to the hollow pinion K which surrounds the shaft P. The hollow shaft runs in two bearings immediately adjoining the pinion K, so that the support of the coupling, in spite of the "flying" arrangement of the cups, is very rigid.

The figure also shows the arrangement of the quill drive for the main gear wheel L, the object of which has already been explained. The main gear wheel L is mounted on the hollow shaft R which, in its turn, is supported in two substantial bearings S_1 and S_2 and is connected at its aft end with the propeller shaft G by an intermediate piece T by means of flanges. The solid shaft V is connected with the propeller shaft by a cone U and with the crank shaft by a flange. As its object is to follow all transverse movements of the crank shaft, it is not supported by bearings. The quill-drive of the main gear wheel has hitherto given excellent results in practice and in none of the many ships in operation has the slightest difficulty arisen.

The latest design of a Bauer-Wach installation for conversions is illustrated clearly by Figs. 3 and 4. These show the exhaust turbine

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plant for the Clan Liner MacNaughton, and are designed for a total power, reciprocating engine and exhaust turbine, of 4,300 h.p., of which about 35 per cent. is delivered by the exhaust turbine.

The left-hand illustration of Fig. 3 shows the assembly with covers removed so that the turbine with its blading, the first reduction gear, and the main wheel with its pinion, can be seen clearly. The hydraulic clutch is arranged in the inside of the wheel of the first reduction as usual. The right-hand illustration gives an outside view of turbine and gearing.

The sectional drawing, Fig. 4, will be easily understood, as it shows the same details as Fig. 2 in a slightly different arrangement.

Taking for a basis the best types of exhaust turbine installa-

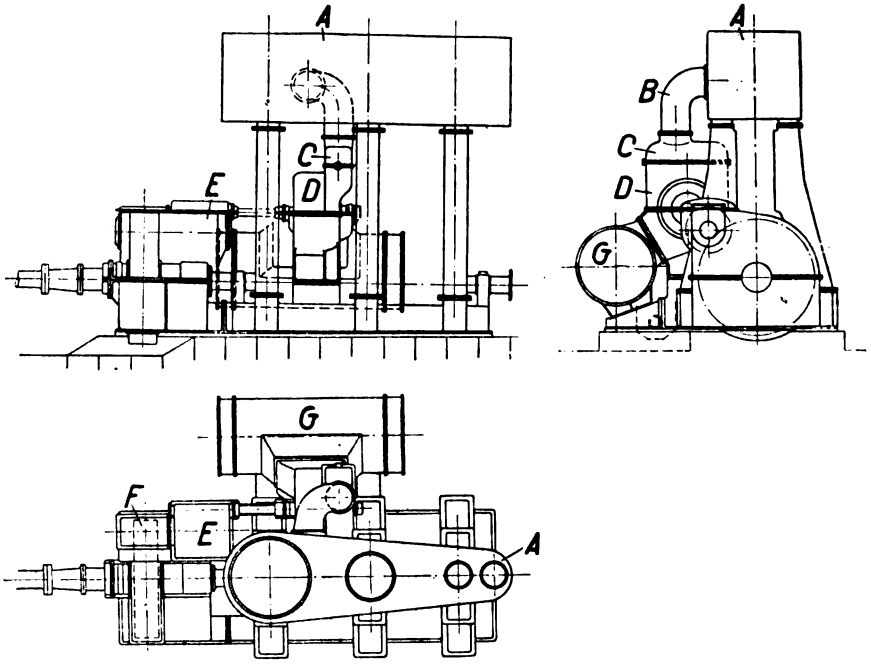


FIG. 5.—LATEST ARRANGEMENT OF COMBINATION MACHINERY OCCUPYING MINIMUM SPACE, AND PROVIDING SHORT LEADS OF STEAM PIPING.

tions so far developed, the Vulcanwerft, Hamburg, is now busy standardising the manufacture of exhaust turbines on their system by creating a series of types suitable for all purposes with the exception of special cases requiring particular attention, but which, on the other hand, seldom occur. This standardisation will enable the builders and their licensees to reduce not only the first cost of such plants, but also the time required for the supply of such machinery.

A third example is shown in Fig. 5. An installation to this design is at present in course of construction at Beardmore's yard in Dalmuir, for a vessel which is being built for the Clan Line by the Greenock Dockyard Company. It is primarily applicable to new ships or new reciprocating engines. This arrangement merits particular

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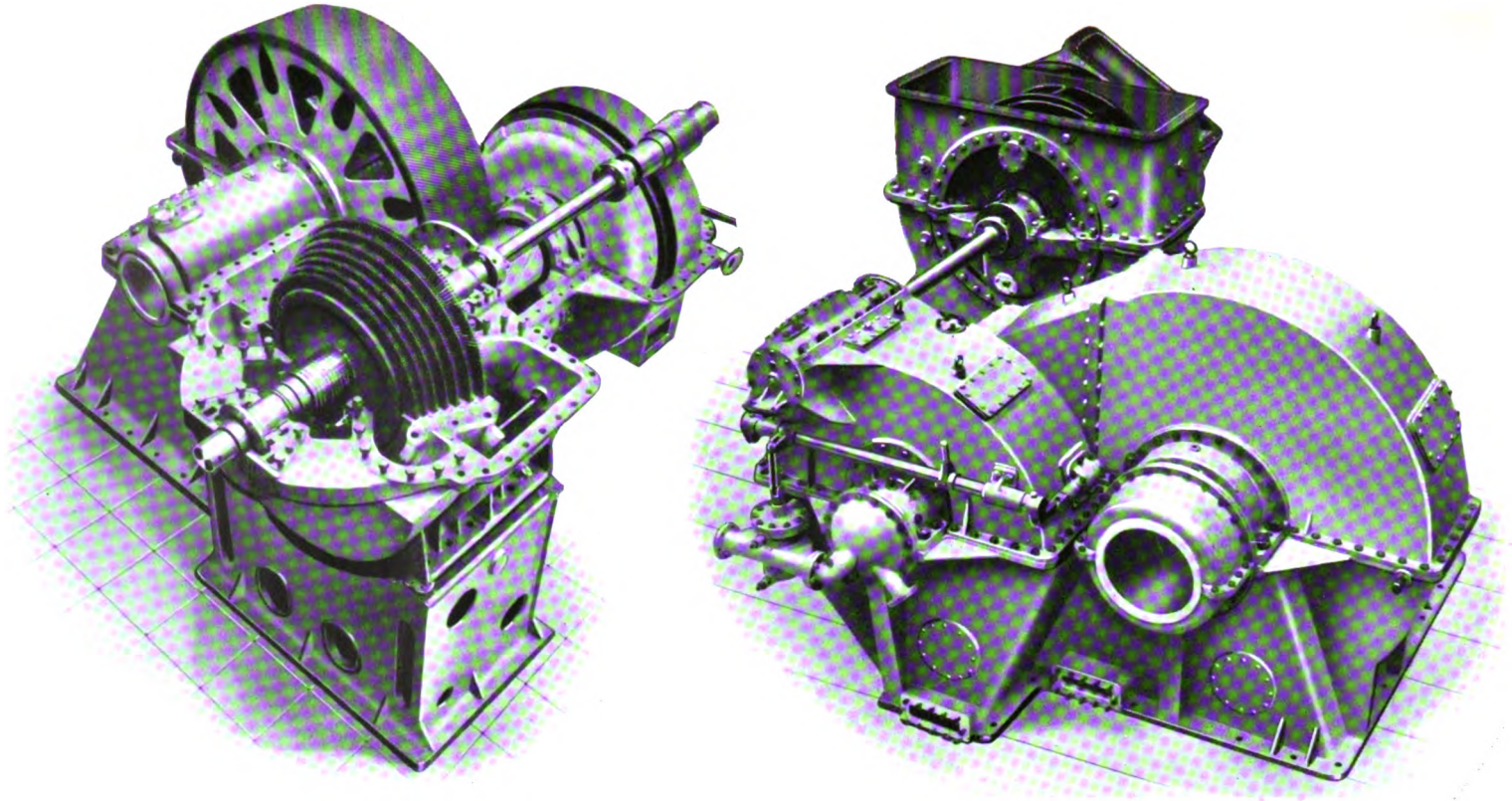


FIG. 3.—COMPLETE B.-W. TURBINE AND GEARING WITH AND WITHOUT CASING COVERS.

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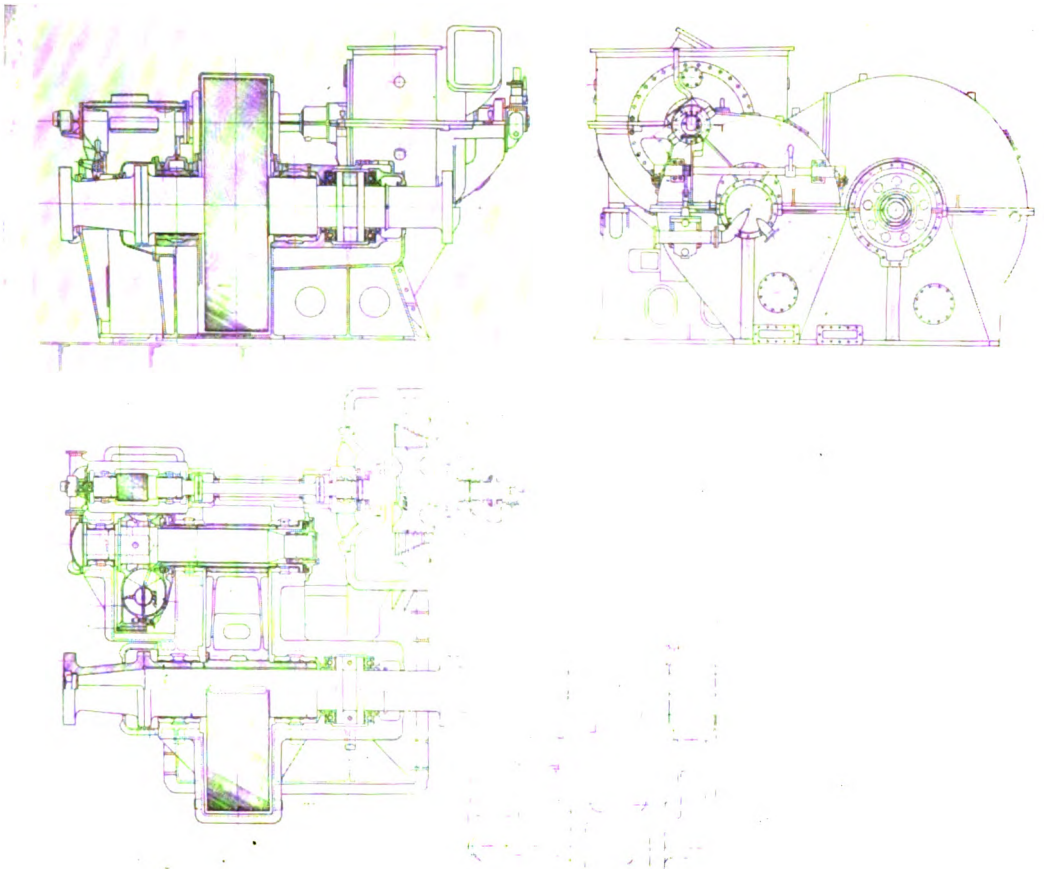


FIG 4.—ARRANGEMENT SHOWING B.-W. TURBINE AND GEARING FITTED *EN BLOC*.

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attention as due to the exhaust turbine being fitted between the columns, the space required aft of the main engine is cut down, and the length of the steam piping reduced to a minimum. This has been attained by placing the exhaust turbine D directly below the L.P. cylinder A and connecting the condenser G direct to the turbine. The length of the steam piping from the L.P. cylinder to the turbine and from there to the condenser is therefore very small, and the turbine drainage is very efficient. The steam flow to turbine or condenser is here controlled by two flap valves contained in the valve chest C which is mounted on the turbine casing, while the flap valves themselves, like the before-mentioned change-over valve, are controlled by the reversing shaft of the reciprocating engine. The gearing EF is substantially of the same design as in the first example, except that, as sufficient space is available, the hydraulic coupling is separate from the gear wheel of the first reduction.

Field of Application.

The field of application for the exhaust turbine is being extended continuously to a wider range of vessels for different purposes. For tankers, in which the reciprocating engine is usually arranged aft, a special design is necessary to allow the propeller shaft to be drawn into the engine-roon. Practical solutions for this problem have been arrived at, and orders for such craft have been placed. There is also an installation in hand for a paddle-steamer of considerable power, and no difficulties have been met in developing a design for this purpose.

Special interest is devoted by the designers to the problem of building exhaust turbines for small cargo ships with a total horsepower of between 1,000 to 2,000 i.h.p. For installations of this kind a very simple design is to be adopted and rigid standardisation adhered to, so as to cut down the first cost to a minimum. The work done in this connection has made very good progress, and several types suitable for this purpose are already detailed.

Fuel Economy with Increased Speed.

In a large number of installations, reliable measurements were taken of output, steam and fuel consumption and speed of the vessel. This was done not only in trial runs, but in the majority of cases during actual sea voyages of ships in service, in many instances in the presence of impartial representatives of the classification societies. Only a few examples may here be taken from the abundant results obtained, which, it may be remarked, were always calculated beforehand and then confirmed by the measurements.

In the twin-screw passenger steamers Cap Norte and Antonio Delfino, of the Hamburg-Südamerikanische Dampfschiffahrtsgesellschaft, which are high-class passenger vessels, and which were provided with exhaust turbines, measurements showed a saving in steam consumption of the main engines of 22 per cent. at the same output as before, and an increase of output of 25 per

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cent. at the same steam consumption as before, although the reciprocating engines of these ships were modern economic superheated engines. These results enabled the owners to extend the service of the ships, and not only to call at a number of new ports, but also to save a day in the voyage from Spain to South America. The numerous voyages already carried out have brought out strongly the advantages of the exhaust turbine, which has worked without a hitch.

The single screw cargo steamer Vigo of the same owners, which was given a similar installation to the foregoing vessels, on her last voyage before conversion averaged 11 knots with a daily consumption of forty-five tons of coal for all purposes. After conversion, in spite of an increase of average speed to 11·3 knots, she was able to reduce her total fuel consumption to 38·3 tons per day.

The two cargo steamers of the Hamburg-America Line, Bochum and Hagen, after they had been converted, reported, on the basis of measurements during the voyages, a total coal consumption for all purposes of 0·463 kgs. per i.h.p. with good American coal, and up to 0·49 kgs. per i.h.p. with medium Westphalian coal, thus showing a saving of 22 per cent. in the main and auxiliary machinery. The engines in this case were also modern and utilised superheated steam.

Measurements made on the cargo steamer Arion, one of eight new vessels built for the Dampfschiffahrtsgesellschaft Neptun by the Deutsche Schiff- und Maschinenbau-Aktiengesellschaft (the readings were taken during a voyage), showed an increased output of 26 per cent. with same steam consumption, which means a daily saving in actual service of 3·2 tons of coal.

Similar favourable results were shown by the new vessels for the Norddeutsche Lloyd, of which the cargo boat Mosel (6,500 i.h.p.) carried out a voyage from Rotterdam to Port Said, over which measurements were taken. These proved that when running on about 5,000 i.h.p. the exhaust turbine saved 16·8 tons of coal daily.

In the freight and passenger steamer Emil Kirdorf, the Hamburg-America Line attached special importance to increasing the speed of the vessel which, before conversion, was about 11 knots. For this purpose on the measured mile in the Eckernford Bay, a number of runs were made at different outputs, which with equal high pressure cut-off showed a gain of speed of 0·81 knot. The simultaneous output readings showed an increase of 29 per cent., and at same steam consumption, *i.e.* reduced h.p. cut-off, an output increase of 25 per cent. Here too the ship is new and works with superheated steam.

With engines working with saturated steam there have been fewer measurements taken up till now, but they confirm that the improvements with the exhaust turbine are, in accordance with the calculations, even greater than in superheated steam engines. The results so far obtained are as follows :—

On the passenger steamer Toledo of the Hamburg-America Line, which has quadruple expansion engines, after exhaust turbines had been fitted and in spite of the h.p. cut-off being reduced by 22 per cent., a power increase of 8 to 10 per cent. was obtained.

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This corresponds to the calculated saving of steam of 23 per cent. for main and auxiliary machinery.

The British single-screw cargo steamer Boniface, owned by the Booth Steamship Co., during trials run at the mouth of the Tyne, performed a six hours' run with and six hours without the exhaust turbine in operation. In the former case, a steam consumption of 4·8 kgs. per i.h.p. was obtained, and in the latter 6·33 kgs. per i.h.p. for all purposes. This means a reduction of steam consumption of 24·4 per cent. through the exhaust turbine. The exhaust turbine installation of the Boniface was supplied by Messrs. Swan, Hunter and Wigham Richardson, Ltd., Newcastle-on-Tyne.

A similar run for purposes of comparison was carried out with the Clan Macfadyen of the Clan Line in the Baltic Sea, and showed a corresponding figure of 24·8 per cent. A run on the measured mile carried out at the same time showed an increase of speed of 0·86 knot over the 12 knots without exhaust turbine.

The largest British vessel so far converted to the Bauer-Wach system, the Anchor liner Britannia, was only two years old when the equipment was installed by William Beardmore and Co., Ltd., Dalmuir. Although she had been fitted with a quadruple expansion reciprocating engine, superheated steam, and oil-fired boilers, thus making her one of the most economical reciprocating-engined steamers afloat, her fuel bill was reduced by 20 per cent. The trials of the Britannia were run in the Firth of Clyde in September last year, and the fuel-consumption was found to be 1·04 lbs. per i.h.p./hour without exhaust-turbine, and 0·832 lb. per i.h.p./hour with the turbine at work, the daily fuel-consumption being reduced by 11·3 tons.

Very favourable results have been also stated on the Dutch steamer Barneveld, in which exhaust turbines have been installed by Messrs. Rotterdamsche Droogdok Maatschappij, Rotterdam, and on the Swedish steamer Narvik. On the latter ship the reciprocating piston engines and exhaust turbines were built by Messrs. Kockums Mekaniska Verkstads A.B., Malmö.

That the above-mentioned figures are the results of ordinary sea service and not exceptional cases, is shown by the fact that shipowners who started with one ship later had an entire class of vessels fitted with exhaust turbines, and also ordered them for new ships. To record a few examples it may be mentioned that the number of ships fitted with B.-W. exhaust turbines by various shipowners are—

16 of the Hamburg-America-Line, Hamburg	totalling	77,000	i.h.p.
15 of the North-German-Lloyd, Bremen	,,	72,000	,,
13 of the D.D.G. "Hansa," Bremen	,,	55,000	,,
9 of the Commonwealth & Dominion Line, Ltd., London	,,	53,500	,,
8 of the Clan Line, Cayzer, Irvine & Co., Ltd., Glasgow	,,	33,150	,,
8 of the D.D.G. "Neptun," Bremen	,,	9,160	,,
5 of the Peninsular and Oriental Steam Nav. Co. . .	,,	40,000	,,
5 of the Hamburg-South-American Line, Hamburg .	,,	27,500	,,
4 of the Steam Trawler Co., "Nordsee," Bremerhaven .	,,	2,800	,,
3 of the Ellerman Line, London	,,	15,400	,,

etc., etc.

It will be noted that twenty-five of the above vessels are British owned. Most of these contracts were placed with the British

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licensees Messrs. William Beardmore and Co., Ltd., Dalmuir, and Messrs. Swan, Hunter and Wigham Richardson, Ltd., Wallsend. At the time of writing the former firm have twenty-one B.-W. exhaust turbines in hand, and the latter firm thirty sets.

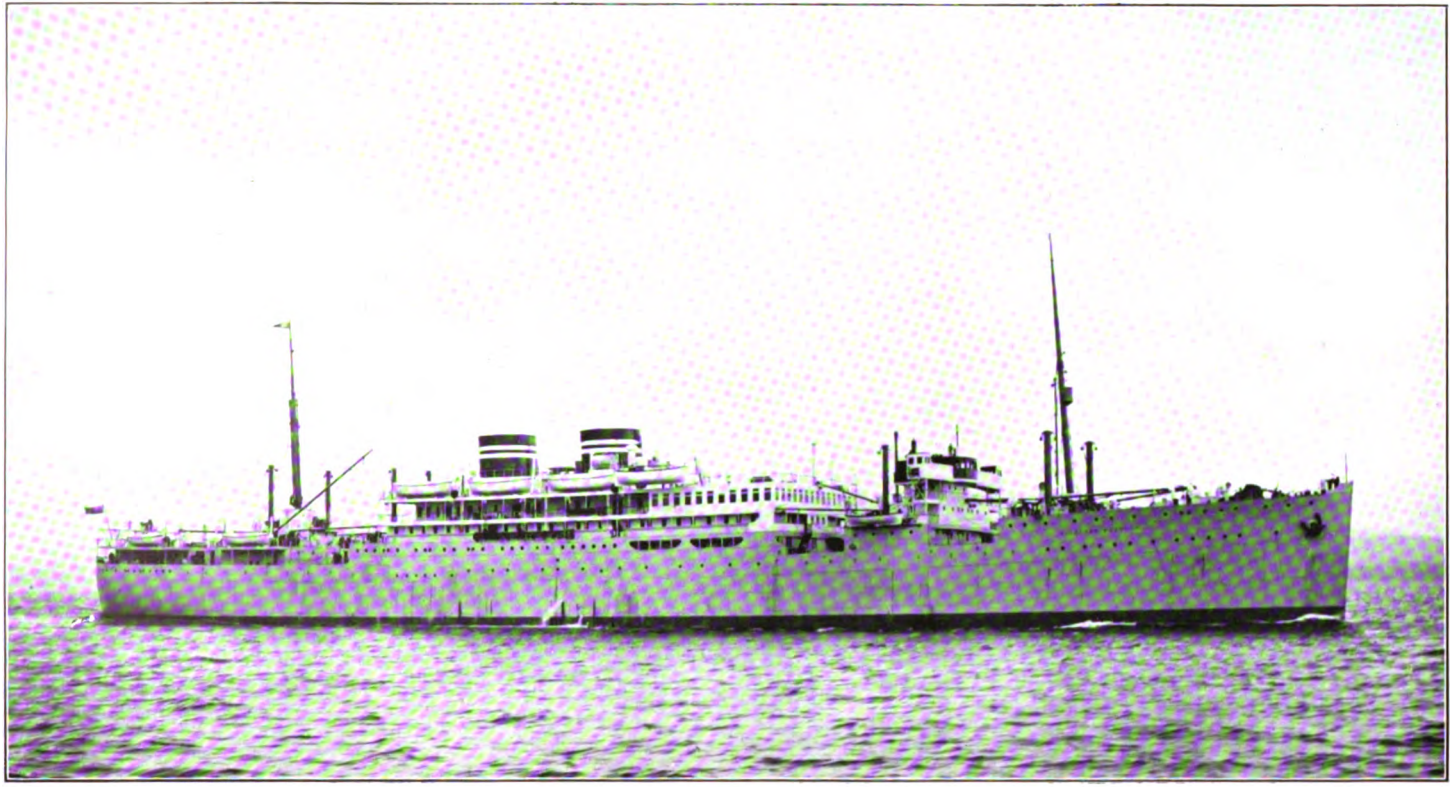
Apart from the economic advantages, the addition of the exhaust turbine to the piston engine presents several minor advantages which, however, may be of very great importance in particular cases. Reference was made previously to the possibility of running the turbine with live steam in case of damage to the reciprocating engine, and making the nearest port in this way. Further, the large inertia of the turbine and gearing masses has an exceedingly steadying effect on the reciprocating engine. A number of voyage reports stated that after the exhaust turbine had been fitted, the Aspinall governor of the reciprocating engine no longer came into operation when the propeller came out of the water in bad weather. A series of measurements by torsionmeters on the propeller shafts showed a considerable reduction in the torque fluctuations. Finally, often the addition of the revolving masses of the exhaust turbine favourably affects the critical speeds of the main engine. In several cases these lay in the vicinity of the working revolutions, but after the addition of an exhaust turbine were considerably below that point.

Many endeavours are made to improve the economy of steam installations by means which are not directly related to the main engines. Most of these improvements can, of course, also be utilised with the B.-W. exhaust turbine-system, thus producing a plant of extraordinary economy. By slightly augmenting the steam pressure in the boilers (up to say 240 lbs./sq. in. in Scotch boilers) by using a comparatively high temperature of superheat, very ample air heaters, double stage feed heaters, and so on, a consumption per i.h.p., including the propelling auxiliaries, of 0·9 lb. of good coal (14,000 B.T.U.) or 0·62 lb. of fuel oil (18,000 B.T.U.) per i.h.p. can reasonably be expected. Coal-dust firing, mechanical stokers, and extra high steam pressures would, of course, reduce the above figures still further.

G. BAUER.

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NELSON LINE MOTOR-SHIP HIGHLAND MONARCH.

(Built and engined by Harland & Wolff, Ltd., Belfast.)

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CHAPTER XIX.

Notable Merchant Ships of the Year.

Whatever may be the conditions ruling in the shipbuilding industry, British shipyards always have in hand many vessels which are of outstanding importance due to certain features of design or embodying notable developments in marine engineering. A selection has been made of some of these new vessels, and they form the subject of a number of plates in the volume. To add interest to these illustrations, the chief characteristics of these vessels are set out in the following brief descriptions.

Passenger and Refrigerated Cargo Motorship.

The distinctive vessel illustrated on the opposite page is the Highland Monarch, and is typical of the fine motor-ships which Harland and Wolff, Ltd., have produced in recent years. This vessel is the first to be completed of five sister-ships which the Nelson Line ordered from the Belfast builders, and are for the owners' service between London and South America, with intermediate ports of call, carrying passengers, refrigerated produce, and general cargo. Particular interest attaches to these new vessels, as they represent the first venture of the owners with internal combustion engined ships. The Highland Monarch has a length B.P. of 520 feet, a breadth of 69 feet, the depth to upper deck being 35 feet 9 inches. She carries 9,070 tons deadweight on a draught of 28 feet 1½ inches, her gross tonnage being 14,137 tons. The refrigerated spaces total 500,000 cubic feet, three of the holds and most of the 'tween decks being so fitted. Accommodation is provided for 135 first-class, 66 intermediate-class passengers, and for 600 emigrants in open berths. The vessel has a very attractive series of public rooms, the furnishing and decoration of which caused much comment when inspected by shipping interests in October when trials were run.

The propelling machinery consists of two sets of eight-cylinder, four-stroke cycle, double-acting heavy oil engines of Harland-Burmeister & Wain type. The engines are of a new long-stroke pattern, each developing 5,000 b.h.p. at 105 r.p.m. In service the engines are to run at 95 r.p.m., which will give the vessel a speed of 15 knots. Practically the whole of the auxiliary machinery, both deck and engine-room, is electrically driven, there being four 200-kw. generators, each driven by a six-cylinder, four-stroke cycle

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Harland-Burmeister and Wain oil engine. An interesting item of the auxiliary machinery is the refrigerating machinery; the ammonia compressors being direct coupled to new type Crossley-Premier horizontal oil engines. The latter are four-stroke cycle airless-injection engines, and each develops 310 b.h.p. at 179 r.p.m. in four cylinders. The Highland Monarch has a very full high-class equipment, and she and her sister-ships are considered by many to be the finest vessels of their type afloat.

New Canadian Pacific Tonnage.

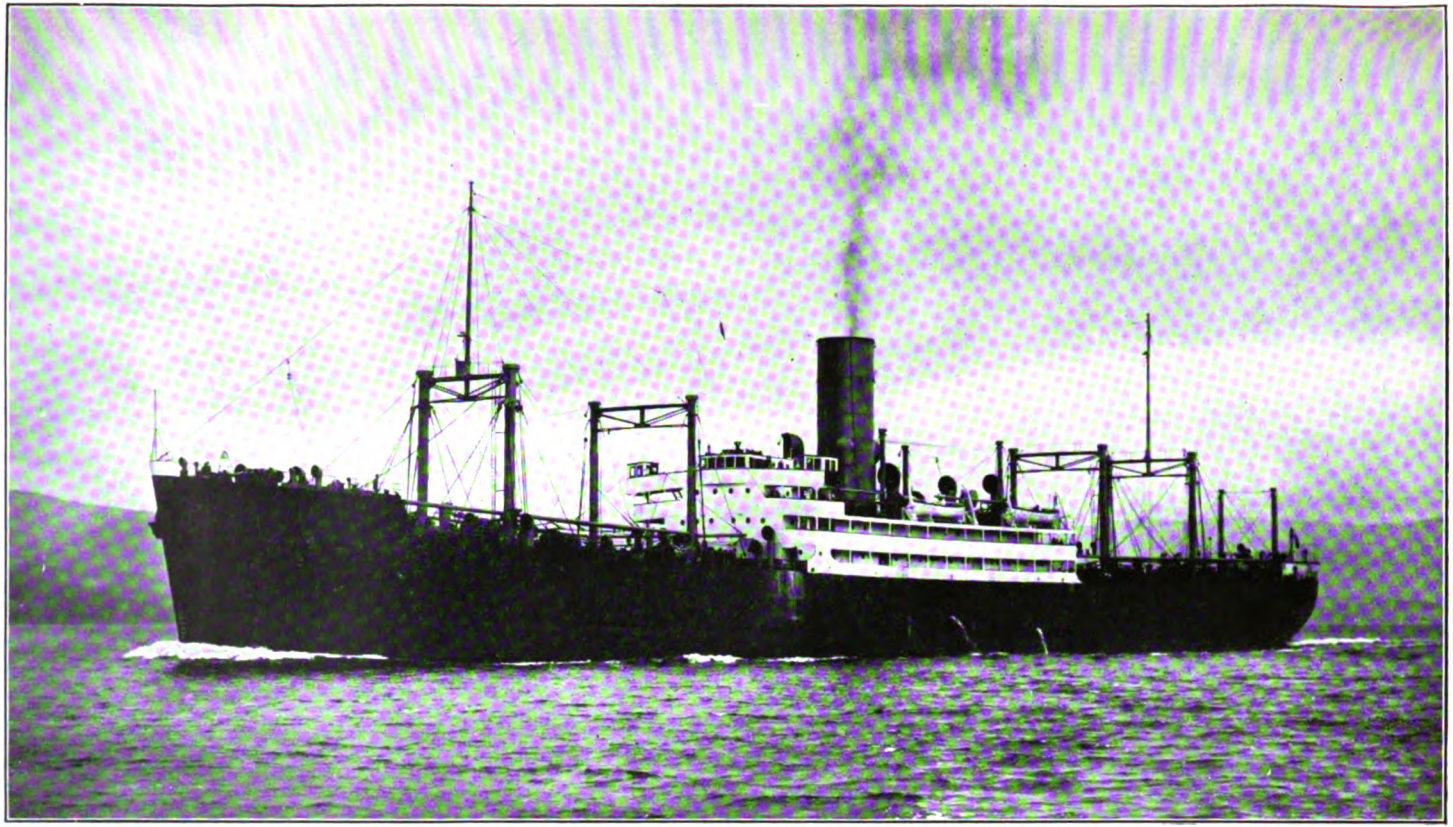
Canadian Pacific Steamships, Ltd., have now taken delivery of three of their new "Duchess" class passenger liners, in which so much interest has been taken, due to the fact that they are the first British passenger liners to be fitted with high-pressure water-tube boilers. There are four vessels of this series, the Duchess of Bedford, Duchess of York, and Duchess of Richmond, ordered from John Brown & Co., Ltd., Clydebank, and the Duchess of Atholl, built by William Beardmore & Co., Ltd., Dalmuir. An illustration of the Duchess of Atholl appears opposite p. 214. Her dimensions are: length, 600 feet; breadth, 75 feet; depth to bridge deck, 53 feet; draught, 27 feet; gross tonnage, 20,500 tons. Accommodation is provided for 600 cabin-class, 500 tourist-class, and 500 third-class passengers, which, with a crew and staff of 409, makes a grand total of 2,009 persons.

The propelling machinery consists of two sets of Parsons' single-reduction geared turbines, developing a total of 20,000 s.h.p. Astern blading is incorporated in the intermediate- and low-pressure ahead casings, the astern power being about 13,000 s.h.p. Steam is supplied to main and auxiliary machinery by six Yarrow three-drum water-tube boilers and two Scotch-type boilers. These are arranged in two boiler-rooms, each having three water-tube and one cylindrical boilers. The main turbines are supplied with superheated steam at a pressure of 370 lbs. per sq. inch and a total temperature of about 680° F., while the Scotch boilers supply steam to certain auxiliaries at 200 lbs. per sq. inch pressure. For certain auxiliaries and for lighting, two 500-kw. geared turbine generators and two 450-kw. Diesel-driven generators are installed. Excellent reports have been received with regard to the performance of these new vessels, and a specific fuel consumption figure of round about 0·62 lb. of oil per s.h.p. per hour for all purposes is stated to have been maintained, which augurs well for the future of high-pressure steam.

The "Beaver" Class Ships.

Interesting features on the engineering side have also been embodied in the new Canadian Pacific cargo liners, Beaverburn, Beaverdale, Beaverhill, Beaverford, and Beaverbrae, which the owners have had built for cargo service between Montreal—London and Continental ports. The Beaverford is illustrated on the opposite page. She has a length of 512 feet, a breadth of 61·5 feet, a depth to upper

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CANADIAN PACIFIC CARGO LINER BEAVERFORD.

(Built and engined by Barclay, Curle & Co , Ltd., Glasgow.)

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deck of 40·5 feet, and a gross tonnage of 9,880 tons. In the six main holds and 'tween decks there is capacity for 570,000 cubic feet of cargo, in addition to which 80,000 cubic feet of insulated space is provided. Officers and crew number about 70, and excellent accommodation has been provided.

The propelling machinery consists of two sets of Parsons' single reduction geared turbines, developing only 7,350 s.h.p. at 110 r.p.m. Steam is supplied by four water-tube and two Scotch-type boilers, all having a working pressure of 250 lbs. per sq. inch. In three of the vessels the water-tube boilers are of the Yarrow type, fitted with Erith-Roe mechanical stokers. Two of the vessels have Babcock and Wilcox boilers arranged for hand firing: thus valuable comparative data should be obtained from these installations. The service speed of these vessels is about 14 knots.

New Orient Liners.

That the Orient Line appreciate the high-class work turned out at Barrow-in-Furness by Vickers-Armstrongs, Ltd., is quite apparent. Of the five liners ordered by this company within the past four years, four of the vessels were contracted for with the Barrow firm. The frontispiece of the volume shows the latest Orient Liner to be completed, the Orford. She is a vessel of 19,941 gross tons, and has somewhat finer lines than her sister-ships. Her dimensions are: length, b.p. 630 feet; breadth, moulded, 75 feet; depth, 47 feet; load displacement, 26,000 tons. On a load draught of 29 feet 8 inches she carries a deadweight of about 10,000 tons. In common with other ships of the Orient Line, the Orford carries only two classes of passengers, and has accommodation for about 520 first- and 1,160 third-class passengers. A feature of the passenger accommodation in the latest Orient Liners is the high proportion of single-berth cabins with bedsteads. There are seven decks on which passengers' accommodation is arranged, either public rooms or cabins, the cabins fitted on the lower deck being portable. A full series of public rooms is provided, the furnishing and decoration being of a very high standard.

The Orford has a speed of 20 knots, and the machinery installation consists of two sets of single reduction-geared turbines of Parsons' reaction type, running at 1,372 r.p.m., the gear ratio being such that the propellers run at 95 r.p.m. The total shaft horse-power developed at this speed is 20,000; the astern power is about 70 per cent. of this. Steam is supplied by six double-ended and two single-ended return-tube boilers. All the boilers have a working pressure of 215 lbs. per sq. inch, and are arranged for burning oil fuel. Most of the auxiliary machinery is electrically driven, and in this connection it is interesting to note that the new Austin system of electric drive for the cargo winches, windlass and capstan gear, was adopted for the first time on board ship. Vickers-Armstrongs, Ltd., are at present engaged on the construction of a fifth vessel for the Orient Line, and it is understood that she is somewhat larger than the Orford and her sister-ships.

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Cargo Motor Liner.

Four high-powered twin-screw motor-ships were ordered some time ago by the Shaw, Savill and Albion Co., Ltd. The first to be completed was the Zealandic, illustrated on the plate facing p. 156. She was built by Swan, Hunter & Wigham Richardson, Ltd., and engined by the Wallsend Slipway & Engineering Co., Ltd. The same firms have built a second vessel, while the remaining two ships were ordered from the Fairfield Shipbuilding & Engineering Co.

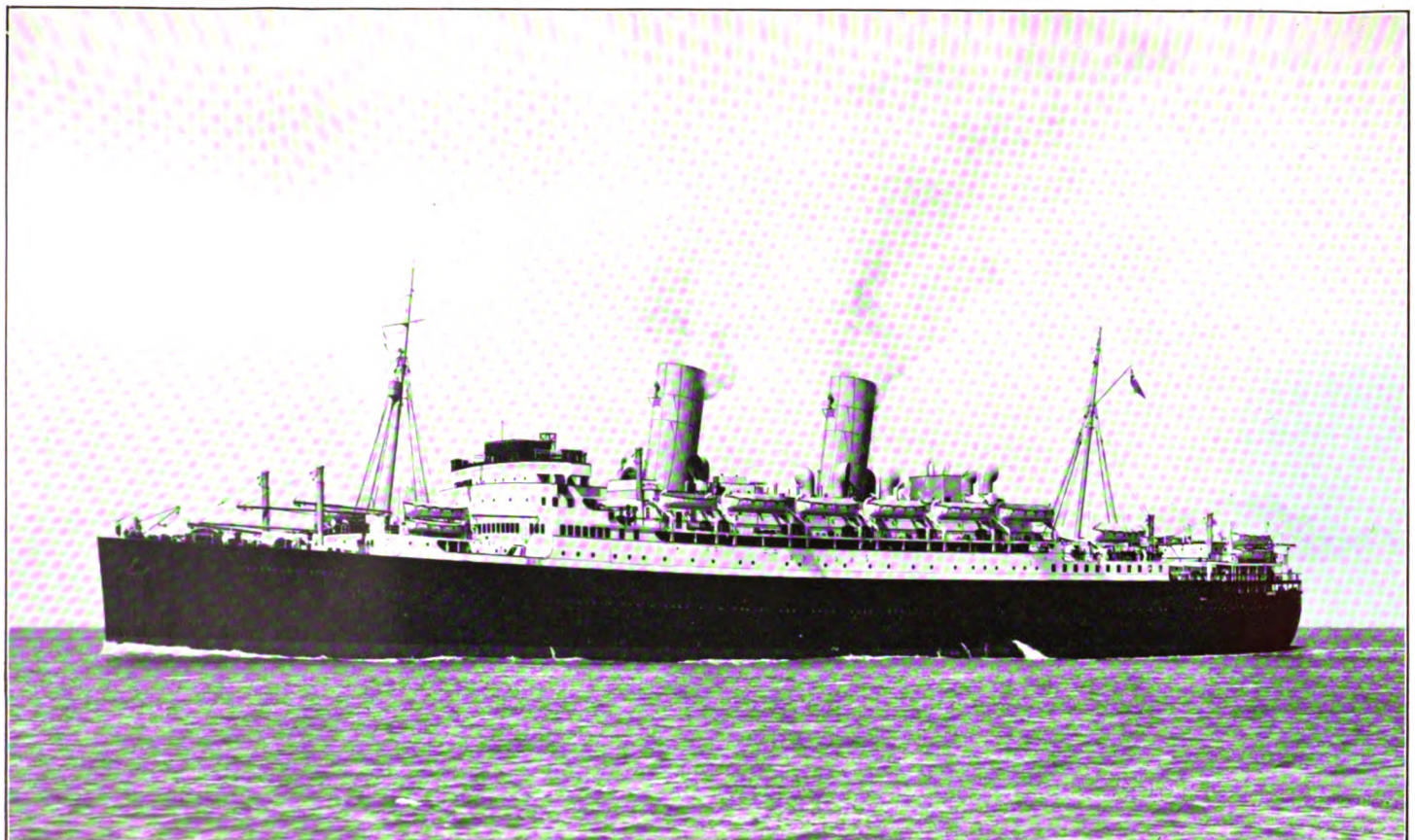
The Zealandic has length b.p. of 481 feet, a moulded breadth of 64 feet 3 inches, a moulded depth of 34 feet 4 inches, and carries a deadweight of 11,190 tons on a draught of 28 feet 9 inches. Five of the six holds and 'tween decks are insulated for the carriage of meat, fruit and dairy produce, the insulated holds having a capacity of 404,000 cubic feet. The vessel is propelled by two Wallsend-Sulzer two-cycle oil engines, which develop a total of 7,450 b.h.p. at 112 r.p.m., giving a service speed of 14½ knots. The auxiliary machinery is electrically driven, power being supplied by four six-cylinder Diesel-driven generators. The Zealandic and her sister-ships run on the owners' service between the Thames and New Zealand, and each vessel can carry a few passengers in well-fitted cabins, there being four double-berth state rooms and a number of public rooms.

46,000-ton German Liners.

Shortly before the war Germany made a very determined effort to attract the best of the North Atlantic traffic with three huge liners, the Imperator, Vaterland, and Bismarck, all of well over 50,000 gross tons and the largest merchant ships in the world. The full effect of this effort was not felt, however, as hostilities broke out before the completion of the Bismarck. After the war, these vessels were handed over to the Allies, and are now better known as the Berengaria, Leviathan, and Majestic. Since 1918, Germany has made strenuous efforts to regain her former position in the shipping world, and has made her presence felt on the North Atlantic route with services maintained by modern vessels of moderate tonnage. The North German Lloyd have taken a further important step, and in the spring of 1919 they will put into service two new liners of about 46,000 gross tons each, named Bremen and Europa, and these, together with the Columbus, after re-engining, will complete the trio necessary for the maintenance of a regular North Atlantic service.

Up to the present little information has been released with regard to the new ships, but it is confidently stated that a service speed of 26 knots will be maintained, so that competition for the mythical Blue Riband of the Atlantic will again be revived. The machinery installations consist of single-reduction geared turbines which, it is understood, will develop a total of 96,000 s.h.p. on four screws. The boilers are of a modified Yarrow type, oil-fired, work-

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CANADIAN PACIFIC LINER DUCHESS OF ATHOLL.
(*Built and engined by Wm. Beardmore & Co., Ltd., Dalmuir.*)

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ing under forced draught and having a working pressure of about 310 lbs. per sq. inch. Diesel generators will supply current for auxiliaries, lighting, heating, and cooking purposes. Each vessel will carry first-, second-, tourist-third, and third-class passengers, accommodation being provided for about 2,200 persons.

Bauer-Wach Installations.

During the past year the first British-built ship to be provided with a Bauer-Wach exhaust-steam turbine installation was completed. This vessel, the Boniface, see plate facing p. 189, was built and engined by R. and W. Hawthorn, Leslie & Co., Ltd., for the Booth Steamship Co., the exhaust-turbine installation being supplied by Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne, who are licensees of the Bauer-Wach system.

The Boniface is a cargo steamer of about 10,000 tons deadweight, and has the following dimensions: length, b.p., 407 feet 9½ inches; breadth, 53 feet 9½ inches; depth, 28 feet 6 inches; draught, 25 feet 2½ inches. The machinery is arranged amidships, and there are two cargo holds forward and two aft of the machinery. Particular interest in this vessel is, of course, due to the special type machinery, but, as the principles and advantages of the Bauer-Wach system are described very fully elsewhere in this volume, it is sufficient to state here that in the case of the Boniface this installation provided an economy of 24½ per cent.

Another interesting application of the Bauer-Wach system was that carried out by the British licensees, William Beardmore & Co., Ltd., Dalmuir, to the two-year-old Anchor Liner Britannia. This vessel, which appears on plate facing p. 170, and has a gross tonnage of 8,464, is propelled by quadruple-expansion engines, using superheated steam supplied by oil-fired boilers. It says much for the Bauer system, therefore, when it is claimed that on trial an economy of 20 per cent. was attained, representing a saving of £7,350 per annum in cost of fuel for the vessel.

Turbo-Electric P. & O. Liner.

No British vessel at present afloat is attracting so much general interest as the new P. & O. Liner Viceroy of India, now completing by Alex. Stephen & Sons, Linthouse, Glasgow. The chief reason for this interest is, of course, the fact that she is the first British passenger liner to be electrically driven, and her owners are worthy of great praise for their courage in making such an important experiment in marine propulsion. The Viceroy of India is also an outstanding vessel in another direction, equally important in its way. She will have single-berth cabins for 415 first-class passengers, a considerably larger proportion than on any other ship, and a notable development in the comfort of sea travelling.

The vessel has the following over-all dimensions: length, 610 feet; breadth, 80 feet; depth to her uppermost deck, 82 feet; gross tonnage, about 19,000 tons; displacement, abou 25,000 tons. The main propelling machinery consists of two turbo-alternators, both

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supplying current to the two slow-speed synchronous motors, which are coupled direct to the twin propeller shafts. At reduced powers, one alternator only is in use, supplying current to both motors, the second alternator standing in reserve, thus obtaining the maximum economy in fuel both at full and reduced power, a great advantage in a vessel which does part of its voyage at something less than the maximum speed and power. The main turbo-alternators each develop 9,000 kw. at 2,700 r.p.m., the turbines being of the Curtis impulse type. The main propelling motors are of the synchronous three-phase type, and are direct-coupled to the propeller shafts at the after end of the engine-room. The motors develop 17,000 s.h.p. at 109 r.p.m., and it is anticipated that when the vessel is steaming full speed ahead, at 18 knots, it will be possible to reverse the propellers and turn in the reverse direction in thirty seconds. The complete installation, turbo-alternators and propelling motors, is being supplied by the British Thomson-Houston Co., of Rugby. The steam generating plant consists of six Yarrow high-pressure water-tube boilers arranged in two stokeholds, the four boilers placed in the after boiler-room being capable of supplying the necessary steam when the vessel is doing 16½ knots. Steam is supplied at 400 lbs. per sq. inch pressure and 700° F. temperature. The auxiliary machinery is electrically driven, there being four auxiliary turbo-generators of 500 kw. each, and two Petter oil-engine driven generators of 165 kw. each. The Viceroy of India was launched in September, and scheduled for her first sailing in the spring of 1929.

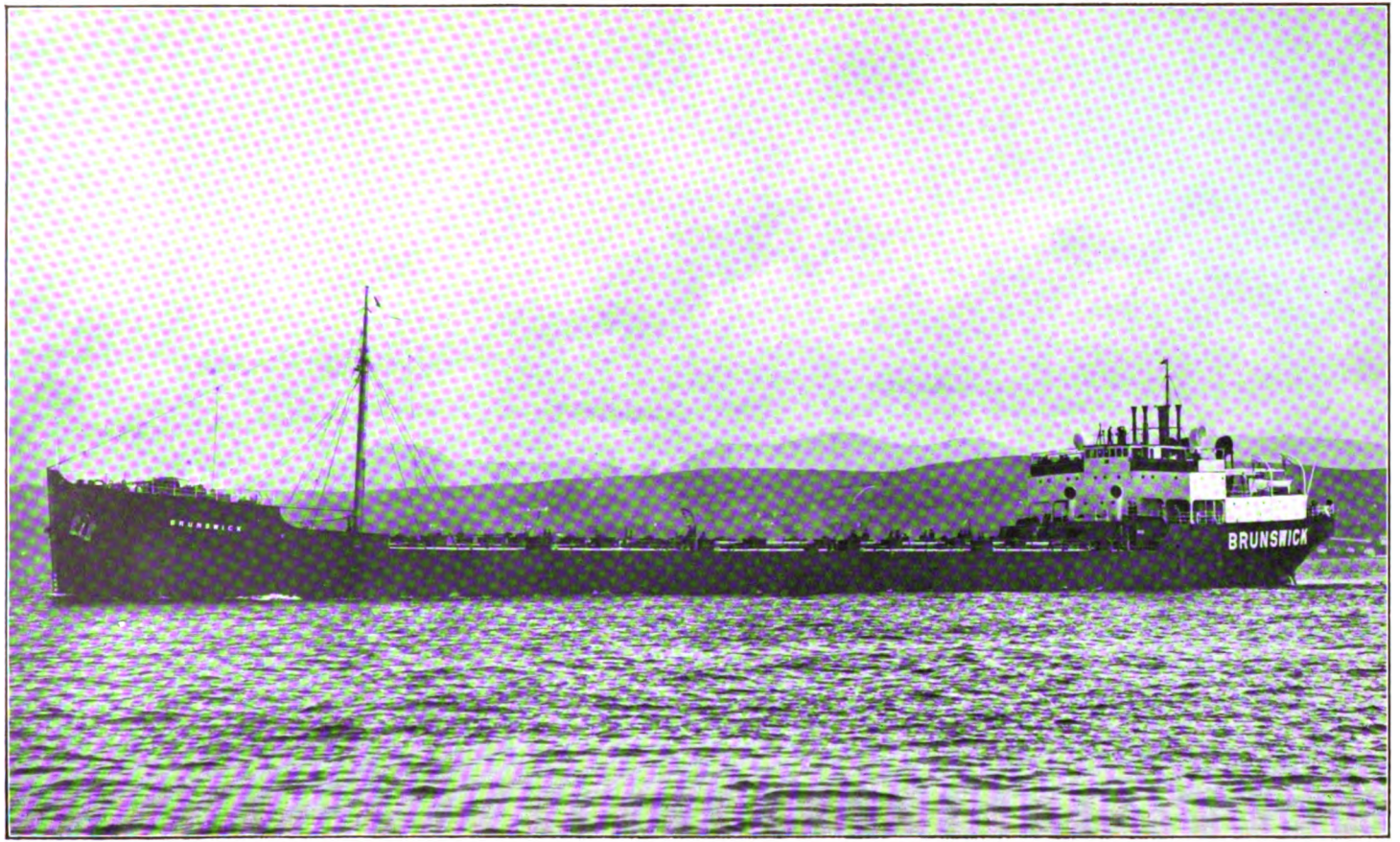
Diesel Electric Tanker.

Electric propulsion, as is well known, has been adopted to a fairly wide extent in America, both for large and small vessels, naval and merchant craft. The Atlantic Refining Co., possess a fleet of nine electrically propelled tankers, and the latest addition to their fleet, the Brunswick, may be assumed to embody many features resulting from the owners' experience with earlier vessels. This vessel, which is illustrated opposite, was built at Greenock by Scotts' Shipbuilding and Engineering Co. She has a length of 469 feet, a breadth of 63 feet, a depth of 36 feet 9 inches, a gross tonnage of 9,200, a deadweight of 12,500 tons, and is built on the Isherwood system of construction. Her propelling machinery consists of four six-cylinder, four-stroke cycle, trunk piston, airless injection, heavy-oil engines of the Ingersoll-Rand type, the cylinder diameter being 19½ inches and the stroke 24 inches. The engines were built under licence by Carel Bros., Ghent, and develop 750 b.h.p. each at 225 r.p.m. Each engine is direct coupled to a B.T.H. 600-kw., 2,400-amp., 250-volt generator, and also to an auxiliary generator of 75 kw. mounted on the same shaft.

The four generating sets are arranged athwartships in the engine-room at the after end of the vessel, while the double-armature B.T.H. propulsion motor is fitted some distance aft of the sets. The propelling motor is rated at 2,800 b.h.p. at 95 r.p.m. The generators are arranged in series so that they supply current at a maximum

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DIESEL-ELECTRIC OIL TANKER BRUNSWICK.

(Built by Scotts' Shipbuilding & Engineering Co., Ltd. Greenock.)

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of 1,000 volts to the propelling motor. The switchgear is arranged athwartships on a flat at the forward end of the engine-room, the control is arranged in this space, and is also carried to the bridge. A low-pressure, waste-heated boiler is provided for supplying steam for heating, steaming out tanks, etc. The service speed of the vessel is about 11 knots, and this was exceeded when the vessel ran trials during August.

Diesel Electric Ferry.

A further interesting application of the electric drive is to be found in the shallow draught, double-ended Diesel-electric passenger and vehicle ferry which Yarrow & Co., Ltd., Scotstoun, Glasgow, built recently for the Argentine Government. This vessel, which is illustrated on plate facing p. 182, was designed for service on the River Parana, involving runs of about 95 miles. Her principal dimensions are: length, 145 feet; breadth, 39 feet 6 inches; draught, loaded, 4 feet 5 inches; displacement, 340 tons. Accommodation for about 150 passengers is provided on the upper deck, and the lower deck will take heavy motor lorries or about 20 motor cars. Cabins and mess-rooms are arranged for the officers and crew.

The propelling machinery consists of two non-reversible four-stroke cycles, single-acting M.A.N. oil engines, each developing 300 b.h.p. at 350 r.p.m. Each engine is coupled direct to a 170-kw. D.C. generator, and attached to the same shaft is a 35-kw. auxiliary generator which supplies current for auxiliary purposes and for exiting the main propulsion generators and motors. The ferry is propelled by twin screws at each end, each of the shafts being driven by a direct-current 200 b.h.p., 250 volt, at 350 r.p.m., electric motor. The electrical installation was supplied by the Metropolitan-Vickers Electrical Co. The auxiliary machinery is all electrically driven. A feature of special interest is the control scheme, which provides manœuvring control from each of three alternative stations—one in each of two pilot houses, situated at opposite ends of the bridge deck, and one in the engine-room. The arrangements are such that each pilot-house controller controls one pair of motors driving the propellers at the opposite end of the vessel, but only one of the pilot-house controllers can be used at a time. In the engine-room there is only one controller, which is arranged to control whichever pair of motors is in operation, or selected for operation, by the deck control gear. The port and starboard propellers are separately controlled by means of two hand levers, one on either side of the controller head. A special delay device is incorporated in the controllers, making it impossible for excessive overloads to be thrown on the propelling machinery due to over-acceleration. No instruments other than revolution indicators are, therefore, required at the pilot-house control stations; in fact, a noteworthy feature of the installation is the manner in which all operations involving special knowledge of the plant is eliminated from the navigating controls. The service speed of the vessel is 17 kms. per hour, but during her trials a speed of over 18 kms. was maintained.

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Canadian National Passenger Ships.

Cammell, Laird & Co., Ltd., are busy on an interesting programme of five passenger steamers for the Canadian National (West Indies) Steamships, Ltd., Montreal. There are two types of vessels according to whether they are to take the eastern or western routes. Those on the eastern service will maintain a regular fortnightly service all the year round from Halifax, N.S., to Bermuda, St. Kitts, Nevis, Antigua, Montserrat, Dominica, St. Lucia, Barbados, St. Vincent, Grenada, Trinidad, and Demerara, returning via the same route to St. John, N.B., and Halifax, N.S. Those on the western service will maintain a fortnightly service between Montreal in summer, and Bermuda, Nassau, in the Bahamas, and Kingston, Jamaica; and in the winter months Halifax and St. John will be the terminals for this service. The dimensions of these vessels are (eastern service): length over all, 438 feet; breadth, 59 feet; depth, to upper deck, 31 feet; gross tonnage, 7,650 tons; deadweight, 6,350 tons on a draught of 24 ft. The vessels on the western service are: length over all, 438 feet; breadth, 60 feet; depth, 32 feet 9 inches; gross tonnage, 7,750; deadweight, 4,200 tons on a draught of 23 feet. All the vessels will have a service speed of 14 knots. The memory of famous British admirals is to be perpetuated by christening the ships Lady Nelson, Lady Drake, Lady Hawkins, Lady Rodney, and Lady Somers.

The three eastern steamers will have accommodation for 103 first-class passengers, 32 second-class, and 100 third-class passengers, and will carry general cargo up to 270,000 cubic feet, and refrigerated cargo up to 13,000 cubic feet. The two western steamers are each to have accommodation for 103 first-class passengers, and there will be 204,000 cubic feet of specially ventilated space for the carriage of bananas, 24,000 cubic feet of space for general cargo, and 15,500 cubic feet refrigerated space. The first vessel to be completed was the Lady Nelson, shown on plate facing p. 163. She is one of the vessels which will maintain the eastern service. All the vessels will be propelled by twin sets of single-reduction geared turbines supplied with steam from oil-fired boilers.

10,000-ton Motor Tankers.

Palmers' Shipbuilding & Iron Co. have an enviable reputation for building oil tankers, and it was only to be expected that when the British Tanker Co. placed orders for a number of new vessels that the Jarrow firm would participate. Of thirteen vessels ordered from six shipyards four of them went to Palmers' S. B. & Iron Co., and one of these, the British Justice, is illustrated opposite p. 148. The vessel has an over-all length of 454 feet, a moulded breadth of 57 feet, and a depth of 34 feet. On a draught of 26 feet 8½ inches she carries a deadweight of 10,200 tons. There are ten main tanks and summer tanks, their respective capacities being 437,620 cubic feet and 67,340 cubic feet, a total of 504,960 cubic

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feet, equivalent to over 10,000 tons. The British Justice is propelled by a Doxford opposed-piston oil engine, developing 2,600 b.h.p. at 81 r.p.m., giving the vessel a service speed, when fully loaded, of 11 knots. Two oil-fired boilers are installed for supplying steam for the cargo pumps, certain auxiliaries, cleaning tanks, and for heating purposes.

W. H. Clapham.

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CAPITAL SHIPS.

[In order to facilitate identification, the ships are arranged in accordance with the number of funnels and masts, as these are the features most easily distinguished at a distance. The page indicated, in the case of warships, refers the reader to the table where full particulars of the ships will be found. All the profiles are drawn to the scale ½ in. = 100 ft.]

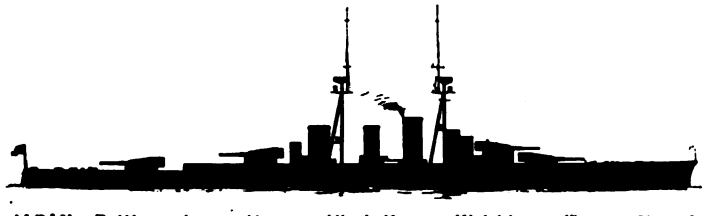
[Indexes to the names of vessels of which profiles are included in this section are given at the end of the volume.]



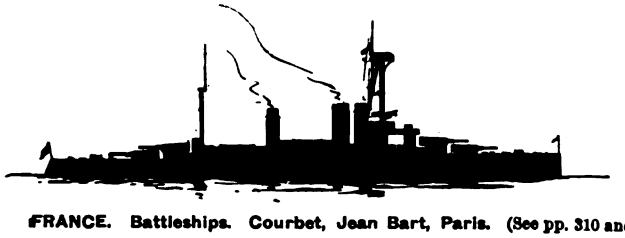
FRANCE. Battleships. Condorcet, Diderot. (See p. 310.)



GREAT BRITAIN. Battle-cruiser. Tiger. (See p. 298.)



JAPAN. Battle-cruisers. Haruna, Hiyei, Kongo, Kirishima. (See pp. 320 and 321.)



FRANCE. Battleships. Courbet, Jean Bart, Paris. (See pp. 310 and 311.

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GREAT BRITAIN. Battle-cruiser. Hood. (See p. 296.)



GREAT BRITAIN. Battle-cruisers. Renown, Repulse. (See p. 297.)



JAPAN. Battleships. Mutsu, Nagato. (See p. 321.)

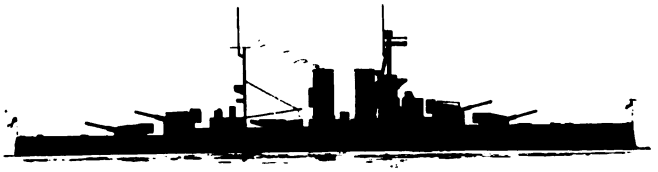


JAPAN. Battleships. Hyuga, Ise. (See p. 320.)



JAPAN. Battleships. Fuso, Yamashiro. (See pp. 320 and 321.)

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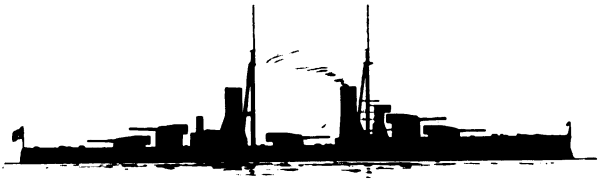
GREAT BRITAIN. Battleships. Barham, Malaya, Valiant.
(See pp. 296 and 298.)



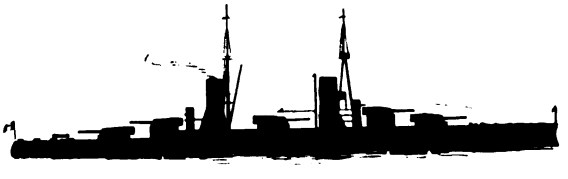
UNITED STATES. Battleships. California, Tennessee, Colorado, Maryland, West Virginia. (See pp. 330, 331, and 333.)



GREAT BRITAIN. Battleships. Benbow, Emperor of India, Iron Duke, Marlborough. (See pp. 296 and 297.)



ITALY. Battleships. Andrea Doria, Caio Duilio. (See p. 317.)



ITALY. Battleships. Conte Di Cavour, Giulio Cesare. (See p. 317.)

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UNITED STATES. Battleships. Arkansas, Wyoming. (See pp. 330 and 333.)



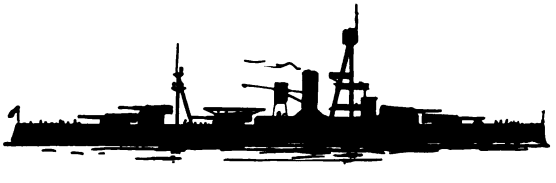
FRANCE. Battleships. Bretagne, Lorraine, Provence. (See pp. 310 and 311.)



GREAT BRITAIN. Battleships. Nelson, Rodney. (See p. 297.)



GREAT BRITAIN. Battleships. Queen Elizabeth, Warspite. (See pp. 297 and 298.)



UNITED STATES. Battleships. New York, Texas. (See pp. 332 and 333.)

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GREAT BRITAIN. Battleships. Ramillies, Resolution Revenge, Royal Oak, Royal Sovereign. (See p. 397)



UNITED STATES. Battleships. Idaho, Mississippi, New Mexico. (See pp. 331 and 332.)



UNITED STATES. Battleships. Arizona, Pennsylvania. (See pp. 330 and 332.)



UNITED STATES. Battleships. Nevada, Oklahoma. (See p. 332.)



UNITED STATES. Battleships. Florida, Utah. (See pp. 331 and 333.)

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CRUISERS.



JAPAN. Cruisers. Abukuma, Naka, Sendai, Jintsu. (See pp. 322 and 323.)



JAPAN. Cruisers. Chikuma, Hirado, Yahagi. (See p. 322.)



ITALY. Armoured Cruisers. San Giorgio, San Marco. (See p. 317.)



FRANCE. Light Cruiser. Mulhouse (*ex-German* Stralsund). (See p. 312.)



ITALY Light Cruiser. Nino Bixio.



GREAT BRITAIN. Cruisers. Birmingham, Lowestoft.
(See pp. 299 and 302.)

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ITALY. Light Cruiser. Taranto (*ex-German* Strassburg). (See p. 319.)



FRANCE. Light Cruiser. Thionville (*ex-Austrian* Novara). (See p. 313.)



GREAT BRITAIN. Cruisers. Berwick, Cornwall, Kent, Suffolk, Cumberland.
(See pp. 299, 302, 303.)
COMMONWEALTH OF AUSTRALIA. Cruisers. Australia, Canberra.
(See p. 304.)



GREAT BRITAIN. Cruisers. Emerald, Enterprise. (See p. 302.)



JAPAN. Light Cruisers. Kiso, Kitakami, Kuma, Oh-i, Tama.
*Isudzu, *Kinu, *Natori, *Nagara, *Yura.
(See pp. 322 and 323.)

* Has aircraft hangar incorporated in bridge structure.

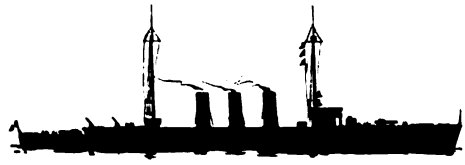


FRANCE. Light Cruiser. Metz (*ex-German* Königsberg). (See p. 312.)

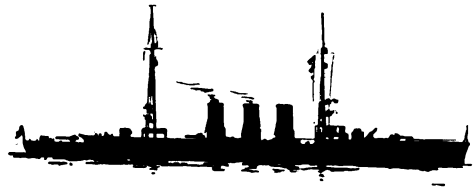
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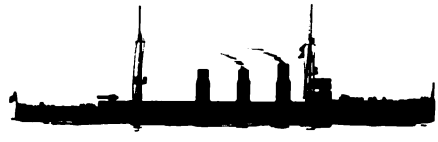
JAPAN. Light Cruisers. Tatsuta, Tenryu. (See p. 323.)



FRANCE. Light Cruiser. Strasbourg (*ex-German* Regensburg). (See p. 313.)



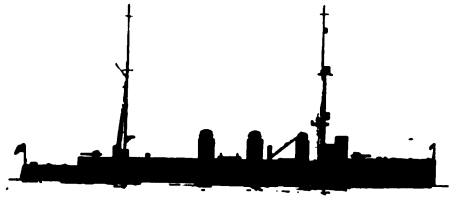
ITALY. Light Cruiser. Ancona (*ex-German* Graudenz). (See p. 313.)



ITALY. Light Cruiser. Bari (*ex-German* Pillau). (See p. 313.)



GREAT BRITAIN. Light Cruiser. Cleopatra. (See p. 299.)



ITALY. Scout Cruiser. Quarto. (See p. 319.)

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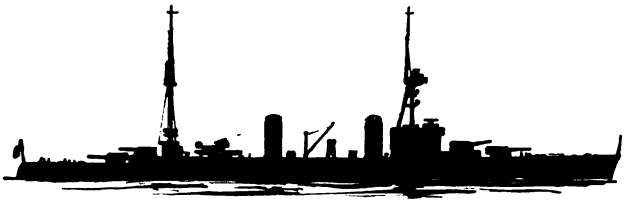
JAPAN. Second Class Cruiser. Tone. (See p. 323.)



GREAT BRITAIN. Cruisers. Effingham, Frobisher, Hawkins, Vindictive (See pp. 302 and 303.)



JAPAN. Cruisers Furutaka, Kako. (See p. 322.)



FRANCE. Cruisers. Duquesne, Tourville. (See p. 312.)



GERMANY. Light Cruisers. Karlsruhe, Konigsberg. (See p. 315.)



GREAT BRITAIN. Cruiser Mine-layer. Adventure. (See p. 299.)

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ITALY. Cruisers. Trento, Trieste. (See p. 318.)



GERMANY. Light Cruiser. Emden. (See p. 315.)



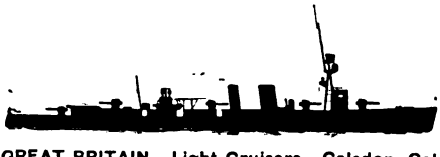
GREAT BRITAIN. Light Cruisers. Danae, Dauntless, Delhi, Dunedin, Dragon, Diomede, Despatch, Durban. (See p. 301.)



GREAT BRITAIN. Light Cruisers. Cardiff, Ceres, Coventry, Curacoa, Curlew. (See p. 301.)



GREAT BRITAIN. Light Cruisers. Cairo, Calcutta, Cape Town, Carlisle, Colombo. (See p. 300.)



GREAT BRITAIN. Light Cruisers. Caledon, Calypso, Caradoc, Centaur, Concord. (See pp. 300 and 301.)

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GREAT BRITAIN. Light Cruisers. Cambrian, Canterbury, Castor, Constance.
(See p. 300.)



JAPAN. Light Cruiser. Yubari. (See p. 323.)



GREAT BRITAIN. Aircraft Carriers. Courageous, Glorious. (See p. 299.)

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TORPEDO BOAT DESTROYERS.



FRANCE. Flotilla Leaders. Bison, Guépard, Lion. (See p. 349.)



FRANCE. Flotilla Leaders. Jaguar, Panthére, Leopard, Lynx, Chacal, Tigre. (See p. 349.)



UNITED STATES. Torpedo Boat Destroyers. Allen, Aylwin, Conyngham. (See p. 364.)



UNITED STATES. Torpedo Boat Destroyer. Clemson. See p. 363.)



FRANCE. Torpedo Boat Destroyers. Aventurier, Intrépide, Téméraire. (See p. 350.)



FRANCE. Torpedo Boat Destroyers. Enseigne Roux, Mécanicien Principal Lestin. (See p. 350.)



FRANCE. Torpedo Boat Destroyer. Bouclier. (See p. 349.)



JAPAN. Torpedo Boat Destroyer. Amatsukaze. (See p. 355.)



FRANCE. Torpedo Boat Destroyers, Bourrasque, Orage, Ouragan, Simoun. (See p. 349.)



UNITED STATES. Torpedo Boat Destroyer. Caldwell. (See p. 364.)



FRANCE. Torpedo Boat Destroyers. Algérien, Annamite, Arabe, Bambara. Hova, Kabyle, Marocain, Sakalave, Sénégalais, Somali, Tonkinois, Touareg. (See p. 350.)



JAPAN. Torpedo Boat Destroyer. Kaba. (See p. 355.)



ITALY. Torpedo Boat Destroyers. Angelo Bassini, E. Cosenz, Francesco Stocco, Giacinto Carini, Giacoma Medici, Giovanni G. Acerbi, Giuseppe la Farina, Giuseppe la Masa, Giuseppe Sirtori, Nicola Fabrizi, Vincenzo G. Orsini. (See p. 353.)



ITALY. Flotilla Leaders. Leone, Pantera, Tigere. (See p. 353.)



ITALY. Torpedo Boat Destroyer. Carlo Mirabello. (See p. 353.)

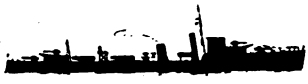
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GREAT BRITAIN. Torpedo Boat Destroyer. Broke. (See p. 341.)



HOLLAND. Destroyers. De Ruyter, Evertsen, Piet Hein, Kortenaer. (See p. 357.)



GREAT BRITAIN. Torpedo Boat Destroyers. Vansittart, Venomous, Verity, Volunteer, Wanderer, Whitehall, Whitshed, Wild Swan, Wishart, Witch, Wren. (See p. 342.)



GREAT BRITAIN. Torpedo Boat Destroyers. Vancouver, Vanessa, Vanity, Vanoc, Vanquisher, Vectis, Vega, Velox, Vendetta, Venetia, Venturous, Verdun, Versatile, Vesper, Videtta, Vimiera, Violent, Vivacious, Vivien Vertigern. (See pp. 342 and 343.)



GREAT BRITAIN. Torpedo Boat Destroyers. Viceroy, Viscount, Voyager, Wakeful, Walker, Walpole, Walrus, Warwick, Watchman, Waterhen, Wessex, Westcott, Westminster, Whirlwind, Whitley, Winchelsea, Winchester, Wolfhound, Wolsey, Woolston, Wrestler, Wryneck. (See pp. 342 & 343.)



GREAT BRITAIN. Destroyers. Ambuscade, Amazon. (See p. 341.)



CHILE. Destroyers. 6 Building by Thornycroft. (See p. 348.)



JAPAN. Torpedo Boat Destroyer. Momo. (See p. 355.)



ITALY. Torpedo Boat Destroyer. Quintino Sella. (See p. 353.)



ITALY. Torpedo Boat Destroyer. Alessandro Poerio. (See p. 353.)



ITALY. Torpedo Boat Destroyer. Nazario Sauro. (See p. 353.)



GREAT BRITAIN. Torpedo Boat Destroyers. Umpire, Urchin, Ursula. (See p. 343.)



GREAT BRITAIN. Torpedo Boat Destroyers. Shikari, Simoom, Tasmania, Tattoo. (See p. 342.)



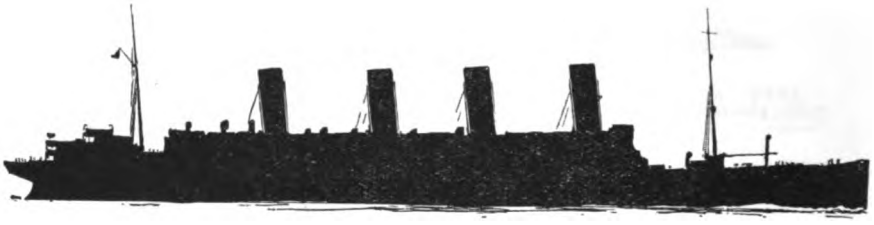
ITALY. Torpedo Boat Destroyer. Palestro. (See p. 354.)



ITALY. Torpedo Boat Destroyer. Turbine. (See p. 353.)

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MERCHANT SHIPS.



AQUITANIA. Cunard. Length, 868 ft. 7 ins.; Gross Tonnage, 45,847; Funnels: Red, Black Tops.



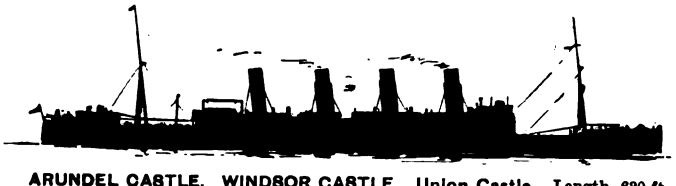
OLYMPIC. White Star. Length, 852 ft. 5 ins.; Gross Tonnage, 46,439; Funnels: Buff, Black Tops.



MAURETANIA. Cunard. Length, 762 ft. 2 ins.; Gross Tonnage, 30,696; Funnels: Red, Black Tops.



FRANCE. Cie. Générale Transatlantique. Length, 689 ft. 2 ins.; Gross Tonnage, 23,666; Funnels: Red, Black Tops.



ARUNDEL CASTLE. WINDSOR CASTLE. Union Castle. Length, 630 ft. 5 ins.; Gross Tonnage, 18,980; Funnels: Red, Black Tops.

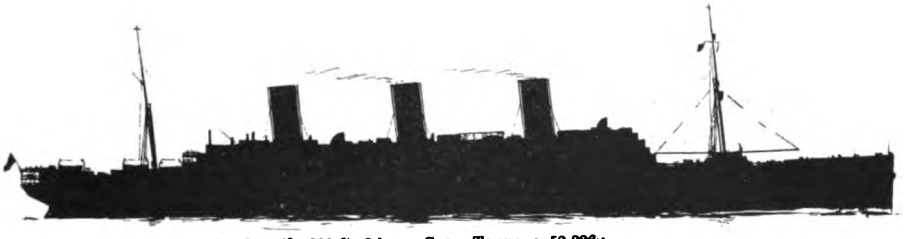
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MAJESTIC. White Star. Length, 915 ft. 5 ins.; Gross Tonnage, 56,551; Funnels: Buff, Black Tops.



LEVIATHAN. United States Shipping Board. Length, 907 ft.; Gross Tonnage, 59,957; Funnels: Red, White Band, Blue Tops.



BERENGARIA. Cunard. Length, 883 ft. 6 ins.; Gross Tonnage, 52,226; Funnels: Red, Black Tops.



ILE DE FRANCE. Cie. Générale Transatlantique. Length, 758 ft.; Gross Tonnage, 42,050; Funnels: Red, Black Top.



PARIS. Cie. Générale Transatlantique. Length, 735 ft. 4 ins.; Gross Tonnage, 34,569; Funnels: Red, Black Tops.



BELGENLAND. Red Star Line. Length, 697 ft.; Gross Tonnage, 27,132; Funnels: Black, White Band.

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CAP POLONIO. Hamburg-South America. Length, 637·7 ft.; Gross Tonnage, 20,576;
Funnels: White, Red Tops.



EMPRESS OF CANADA. Canadian Pacific. Length, 627 ft.; Gross Tonnage, 21,517;
Funnels: Yellow.



RELIANCE. RESOLUTE. Hamburg-Amerika Line. Length, 592 ft.;
Gross Tonnage, 19,582;
Funnels: Yellow, with Black, White and Red Bands at Top.



EMPRESS OF AUSTRALIA. Canadian Pacific. Length, 589 ft. 8 ins.; Gross Tonnage, 21,861;
Funnels: Yellow.



NALDERA. Peninsular and Oriental. Length, 580 ft. 9 ins.; Gross Tonnage, 15,825;
NARKUNDA. " " " Length, 581 ft. 4 ins.; Gross Tonnage, 16,118;
Funnels: Black.

(The Narkunda is similar to the Naldera but has raised forecastle.)



MASSILIA. Cie. Sud Atlantique. Length, 579 ft.; Gross Tonnage, 15,147;
Funnels: Buff, Black Tops. Cockerel on sides.

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LUTETIA. Cie. Sud Atlantique. Length, 579 ft.; Gross Tonnage, 14,654; Funnels: Buff, Black Tops. Cockerel on side.



EMPRESS OF ASIA. EMPRESS OF RUSSIA. Canadian Pacific. Length, 570 ft. 1 in. Gross Tonnage, 16,909; Funnels: Yellow.



TRANSYLVANIA. CALEDONIA. Anchor Henderson. Length, 550 ft; Gross Tonnage, 17,000; Funnels: Black.



CHAMPOLLION. Messageries Maritimes. Length, 508 ft. 6 ins.; Gross Tonnage 12,500; Funnels: Black.



TAIREA. TAKLIWA. TALAMBA. British India S.N. Co. Length, 449 ft. 6 ins.; Gross Tonnage, 8,000; Funnels: Black, Two White Bands, Black Tops.



PRINCESS KATHLEEN. PRINCESS MARQUERITE. Canadian Pacific. Length, 350 ft.; Gross Tonnage, 6,000; Funnels: Yellow.

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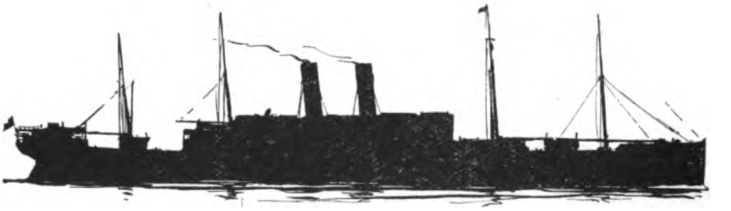
CIUDAD DE BUENOS AIRES. Argentine S.N. Co. **CIUDAD DE MONTE VIDEO.** Uruguayan S.N. Co. Length, 350 ft.; Gross Tonnage, 3,864; Funnels: Yellow, Black Tops.



PRINCESS ELAINE. Canadian Pacific. Length 291 ft.; Gross Tonnage, 2,000 Funnels Yellow.



ADRIATIC BALTIC. White Star. Length, 709 ft. 2 ins.; Gross Tonnage, 24,541; Funnels: Buff, Black Tops.



GEORGE WASHINGTON. United States Shipping Board. Length, 699 ft. Gross Tonnage, 23,788; Funnels: Red, White Band, Blue Top. U.S.A. shield on side.



CEDRIC. CELTIC. White Star. Length, 680 ft. 9 ins.; Gross Tonnage, 21,073; Funnels: Buff, Black Tops.



EMPRESS OF SCOTLAND. Canadian Pacific. Length, 677 ft.; Gross Tonnage, 25,128 Funnels: Yellow.

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LAPLAND. **Red Star Line.** Length, 605 ft.; Gross Tonnage, 18,565;
Funnels: Black, White Band.



ALBERT BALLIN. **DEUTSCHLAND.** **Hamburg-Amerika Line.** Length, 602 ft. 6 ins.
Gross Tonnage, 20,815;
Funnels: Yellow, with Black, White and Red Band at Top.



HOMERIC. **White Star.** Length, 751 ft.; Gross Tonnage, 34,351
Funnels: Buff, Black Tops.



COLUMBUS. **Norddeutscher Lloyd.** Length, 749 ft. 6 ins; Gross Tonnage, 32,354;
Funnels: Yellow.



M.S. AUGUSTUS. **Navigazione Generale italiana.** Length, 666 ft; Gross Tonnage, 33,500;
Funnels: Black, White Band.



ROMA. **Navigazione Generale Italiana.** Length, 664 ft. 6 ins.; Gross Tonnage, 33,000;
Funnels: Black, White Band.

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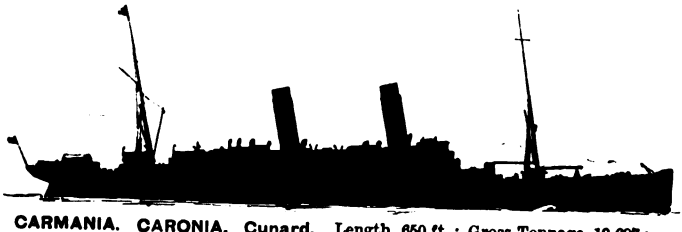
ORFORD. ORAMA. ORONSAY. OTRANTO. Orient. Length, 658 ft.; Gross Tonnage, 20,000; Funnels: Cream.



M.S. ASTURIAS. Royal Mail Steam Packet Co. Length, b.p., 655 ft. 8 ins.; Gross Tonnage, 22,000 tons; Funnels: Buff.



CONTE BIANCAMANO. CONTE GRANDE. Lloyd Sabaudo. Length, 655 ft. Gross Tonnage, 23,000; Funnels: Yellow, White Band between Two Narrow Blue.



CARMANIA. CARONIA. Cunard. Length, 650 ft.; Gross Tonnage, 19,687; Funnels: Red, Black Tops.

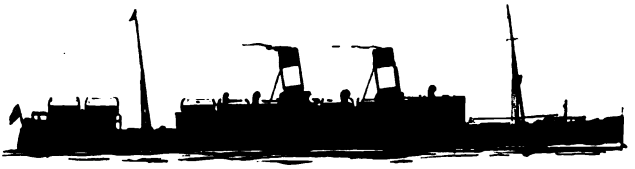


ROTTERDAM. Holland-America. Length, 650 ft.; Gross Tonnage, 24,149; Funnels: Buff, Two Blue Bands with White Band between, Buff Tops.



M.V. CARNARVON CASTLE. Union Castle Line. Length, 629 ft.; Tonnage, 22,000; Funnels: Red, Black Tops.

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GIULIO CESARE. **Navigazione Generale Italiana.** Length, 626 ft. ; Gross Tonnage, 21,657 ;
Funnels : Black, Broad White Band.



MOOLTAN. **MALOJA.** **Peninsular and Oriental.** Length, 625 ft. ; Gross Tonnage, 20,847 ;
Funnels : Black.



HAMBURG. **NEW YORK.** **Hamburg-Amerika Line.** Length, 602 ft. ; Gross Tonnage, 20,815 ;
Funnels : Yellow, with Black, White and Red Band at Tops.



LAURENTIC. **White Star.** Length, 600 ft. ; Gross Tonnage, 18,700 ;
Funnels : Buff, Black Tops.



REGINA. **White Star—Leyland Line.** Length, 600 ft. ; Gross Tonnage, 16,500 ;
Funnels : White Star Colours, Buff, Black Tops.



MONTNAIRN. **Canadian Pacific.** Length, 590 ft. ; Gross Tonnage, 17,282 ;
Funnels : Yellow.

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ALBERTIC. White Star. Length, 588 ft. 8 ins.; Gross Tonnage, 18,000; Funnels: Buff, Black Tops.



M.S. VICEROY OF INDIA. Peninsular and Oriental. Length, 585 ft.; Gross Tonnage; 19,000. Funnels; Black.



DUCHESS OF BEDFORD. DUCHESS OF RUTLAND. DUCHESS OF YORK. Canadian Pacific. Length, 580 ft. Gross Tonnage, 20,118; Funnels Yellow.



ORMONDE. Orient Line. Length, 580 ft. 5 ins.; Gross Tonnage, 14,853; Funnels: Cream.



M.S. AORANGI. Union Steam Ship Co. of N.Z. Length, 580 ft.; Gross Tonnage, 17,500; Funnels: Red, Black Tops.



VEENDAM. VOLENDAM. Holland-America Line. Length, 576 ft.; Gross Tonnage, 15,434; Funnels: Buff, White Band between Two Green.

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SAXON. Union Castle Line. Length, 570 ft. 5 ins.; Gross Tonnage, 12,385; Funnels: Red, Black Tops.

Brassey's Naval and Shipping Annual, 1929.

ERRATA.

Page 244—

For "M.S. Viceroy of India." *read* "S.S."

The Canadian Pacific Liners are named "Duchess of Atholl," "Duchess of Bedford," "Duchess of Richmond," and "Duchess of York," instead of as printed.



ARMADALE CASTLE. Union Castle Line. Length, 570 ft. 1 in.; Gross Tonnage, 12,973; Funnels: Red, Black Tops.



EMPRESS OF FRANCE. Canadian Pacific. Length, 570 ft.; Gross Tonnage 18,357; Funnels: Yellow.



BALMORAL CASTLE. EDINBURGH CASTLE. Union Castle Line. Length, 520 ft.; Gross Tonnage, 13,361; Funnels: Red, Black Tops.



ROCHAMBEAU. Cie. Générale Transatlantique. Length, 559 ft.; Gross Tonnage, 17,400; Funnels: Red, Black Tops.

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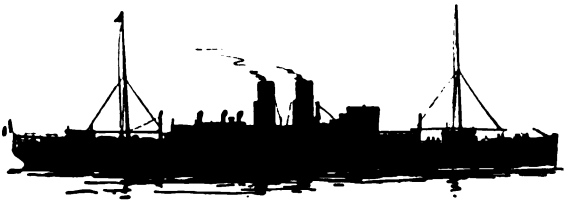
MALOLO. Matson Line. Length, 554 ft.; Gross Tonnage, 17,200;
Funnels: Yellow, Black Tops, "M" on sides.



DRESDEN. Norddeutscher Lloyd. Length, 550 ft.; Gross Tonnage, 14,688;
Funnels: Yellow.



M.S. GRIPSHOLM. Swedish American Line. Length, 550 ft.; Gross Tonnage, 17,000;
Funnels: Yellow, Blue Discs on Sides.



DE GRASSE. Cie. Générale Transatlantique. Length, 550 ft.; Gross Tonnage, 17,000;
Funnels: Red, Black Tops.



TENYO MARU. SHINYO MARU. Toyo Kisen Kaisha. Length, 550 ft.;
Gross Tonnage, 13,400.
Funnels: Yellow, Black Tops.



MONTCALM. MONTCLARE. MONTROSE. Canadian Pacific.
Length, 549 ft. 5 ins.; Gross Tonnage, 16,418;
Funnels: Yellow.

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MONTROYAL. Canadian Pacific. Length, 548 ft. 8 ins.; Gross Tonnage, 15,857;
Funnels: Yellow.



RAJPUTANA. RANCHI. RAWALPINDI. P. & O. Line. Length, 547 ft.
Gross Tonnage, 16,100;
Funnels: Black.



D'ARTAGNAN. Messageries Maritimes. Length, 541 ft.;
Gross Tonnage, 13,960;
Funnels: Black.



MALWA. MANTUA. MOREA. P. & O. Line. Length, 540 ft.;
Gross Tonnage, 10,941;
Funnels: Black.



GELRIA. Koninklijke Hollandsche Lloyd. Length, 540 ft.; Gross Tonnage, 13,868;
Funnels: Yellow, Black Band.



NIEW ZEELAND. NIEW HOLLAND. Koninklyke Paketvaat Maatschappy.
Length, 540 ft.; Gross Tonnage, 11,000;
Funnels: Buff, narrow Black Top.

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ORSOVA. **Orient Line.** Length, 536 ft. 2 ins.; Gross Tonnage, 13,036; Funnels: Cream.



ORVIETO. **Orient Line.** Length, 535 ft. 3 ins.; Gross Tonnage, 12,133; Funnels: Cream.



OSTERLEY. **Orient Line.** Length, 535 ft.; Gross Tonnage, 12,129; Funnels: Cream.



STAVANGERFJORD. **Norske Amerika Linie.** Length, 532 ft.; Gross Tonnage, 12,977; Funnels: Yellow, Two Red and Two White Bands with Blue Band between.



MACEDONIA. **P. & O. Line.** Length, 530 ft. 4 ins.; Gross Tonnage, 11,089; Funnels: Black.



ANDRE LEBON. **Messageries Maritimes.** Length, 528 ft. Gross Tonnage, 13,651; Funnels: Black.

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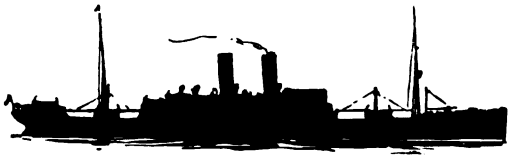
CATHAY. CHITRAL. COMORIN. P. & O. Line. Length, 525 ft.; Gross Tonnage, 15,000; Funnels: Black.



M.S. BERMUDA. Bermuda & West Indies S.S. Co. Length, 525 ft.; Funnels: Black, Red, Thin Black and Red Bands, Black Tops.



NIAGARA. Union Steam Ship Co. of N.Z. Length, 524 ft. 7 ins.; Gross Tonnage, 13,415; Funnels: Red, Black Tops.



FREDERIK VIII. Det Forenede Damskibs Selskab. Length, 523 ft.; Gross Tonnage, 11,850; Funnels: Black, Red Band.



KAISAR-I-HIND. P. & O. Line. Length, 520 ft.; Gross Tonnage, 11,430; Funnels: Black.



MINNEDOSA. Canadian Pacific. Length, 520 ft.; Gross Tonnage, 14,000; Funnels: Yellow.

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BERGENSFJORD. Norske Amerika Linie. Length, 512 ft. ; Gross Tonnage, 10,709 ;
Funnels : Yellow, Two Red and Two White Bands with Blue Band between.



ALMEDA. ANDALUSIA. ARANDORA. AVELONA. AVILA. Blue Star Line.
Length, 510 ft. ; Gross Tonnage, 14.000 :
Funnels : Red, Black Tops, White Band on Black,
Blue Star on White Disc on Red.



H. F. ALEXANDER. Admiral Line. Length, 509 ft. Gross Tonnage, 8,255 ;
Funnels : Tan, Black Top, White Disc with Flag.



CHICAGO. Cie. Générale Transatlantique. Length, 508 ft. ; Gross, Tonnage, 14,250 ;
Funnels : Red, Black Tops.



METAGAMA. Canadian Pacific. Length, 500 ft. 4 ins. ; Gross Tonnage, 12,420 ;
Funnels : Yellow.



RASMAK. P. & O. Line. Length, 500 ft. ; Gross Tonnage, 10,000;
Funnels : Black.

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ALBERTVILLE. Compagnie Belge Maritime Du Congo. Length, 498 ft.; Gross Tonnag , 10,769.
Funnels: Yellow.



PATRIA. Wm. Ruys & Zonen. Length, 480 ft.; Gross Tonnage. 9,991;
Funnels: Black.



SPHINX. Messageries Maritimes. Length, 479 ft.; Gross Tonnage, 11,374;
Funnels: Black.



PRESIDENTE WILSON. Cosulich Line. Length, 477 ft. 5 ins.; Gross Tonnage, 12,578;
Funnels: Red, White Band, Black Top.



PORTHOS. Messageries Maritimes. Length, 476 ft.; Gross Tonnage, 12,691;
Funnels: Black.



CUBA. Cie. Générale Transatlantique. Length, 476 ft.; Gross Tonnage. 11 400;
Funnels: Red, Black Tops.

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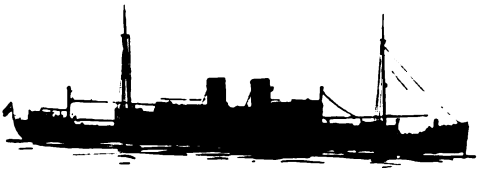
FLANDRIA. ORANIA. Koningen Hollandsche Lloyd. Length, 470 ft.; Gross Tonnage, 9,673; Funnels: Yellow, Black Band.



FLORIDA. Société Générale de Transport Maritimes à Vapeur. Length, 471 ft. 2½ ins.; Gross Tonnage, 9,149; Funnels: Black, Red Band.



MARTHA WASHINGTON. Cosulich Line. Length, 459 ft.; Gross Tonnage, 8,347; Funnels: Red, White Band, Black Tops.



M.S. MAGDALENA and ORINOCO. Hamburg America. Length, 456 ft. 8 ins.; Gross Tonnage, 9,540; Funnels: Yellow, with Black, White, and Red Band at Tops.



TALMA. TILAWA. British India S.N. Co. Length, 450 ft.; Gross Tonnage, 10,000; Funnels: Black, Two White Bands, Black Tops.



PEROU. Cie. Générale Transatlantique. Length, 449 ft.; Gross Tonnage, 6,600; Funnels: Red, Black Tops.

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DE LA SALLE. Cie. Générale Transatlantique. Length, 440 ft.; Gross Tonnage, 8,400; Funnels: Red, Black Tops.

SINAIA. Cyp. Fabre. Length, 440 ft.; Gross Tonnage, 8,666.



ASIE. Chargeurs Reunis. Length, 439 ft.; Gross Tonnage, 9,059; Funnels: Yellow, Red Stars on White Band.



M.S. THÉOPHILE GAUTIER. Messageries Maritimes Length, 425 ft.; Gross Tonnage, 9,000; Funnels: Black.



SIMON BOLIVAR. Royal Nederlands West Indian Mail Line. Length, 420 ft.; Gross Tonnage, 7,906; Funnels: Black, Two White Bands.



HAYTI. Cie. Générale Transatlantique. Length, 410 ft.; Gross Tonnage, 6,179, Funnels: Red, Black Tops.



M.S. RIO BRAVO. M.S. RIO PANUCO. Flensburger Dampfer Co. (H. Schuldt). Length, 410 feet; Gross Tonnage, 6,000; Funnels: Black, Blue Band, White Diamond with Red S.



NAGASAKA MARU. SHANGHAI MARU. Nippon Yusen Kaisha. Length, 402 ft.; Gross Tonnage, 5,272; Funnels: Black.

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ARANKOLA. British India S.N. Co. Length, 390 ft. 8 ins.; Gross Tonnage, 4,129; Funnels: Black, Two White Bands, Black Tops.



CAMBRIA. HIBERNIA. SCOTIA. London, Midland and Scottish Railway. Length, 380 ft. 5 ins.; Gross Tonnage, 3,460; Funnels: Yellow, Black Tops.



WAHINE. Union Steam Ship Co. of N.Z. Length, 375 ft.; Gross Tonnage, 4,436; Funnels: Red, Black Tops.



KEIFUKU MARU. SHOKEI MARU. TOKUJU MARU. Imperial Japanese Railway. Length, 375 ft.; Gross Tonnage, 5,857; Funnels: Yellow, Black Top, Red ⊥ on Yellow.



GOUVERNEUR GENERAL CHANZY. GOUVERNEUR GENERAL GREVY. DE QUEYDON. JONNART. French Government. Length, 361 ft.; Gross Tonnage, 4,500.



ST. ANDREW. ST. DAVID. ST. PATRICK. Great Western Railway. Length, 351 ft. 1 in.; Gross Tonnage, 2,495; Funnels: Red, Black Tops.



DUKE OF ARGYLE. DUKE OF LANCASTER. London, Midland, and Scottish Railway. Length, 349 ft.; Gross Tonnage, 3,608.

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MENEVIA. **London, Midland and Scottish Railway.** Length, 329 ft. ;
Gross Tonnage, 1,872 ;
Funnels : Yellow, Black Tops.



ANTWERP. MALINES. **London and North Eastern Railway** Length, 321 ft. 6 ins. ;
Gross Tonnage, 2,957 ;
Funnels : Yellow, Black Tops.



CURRAGHMORE. **London, Midland and Scottish Railway.** Length, 307 ft. 1 in. ;
Gross Tonnage, 1,587 ;
Funnels : Yellow, Black Tops.



ST. HELIER. ST. JULIEN. **Great Western Railway.** Length, 290 ft. ;
Gross Tonnage, 2,000 ;
Funnels : Red, Black Top



HANTONIA. NORMANNIA. **Southern Railway.** Length, 290 ft. 3 ins. ;
Gross Tonnage, 1,567 ;
Funnels : Buff.



REINDEER. **Great Western Railway.** Length, 280 ft. ; Gross Tonnage 1,101 ;
Funnels : Red, Black Tops.



DIEPPE. **Southern Railway.** Length, 273 ft. 5 ins. ; Gross Tonnage, 1,228 ;
Funnels : White, Black Tops.

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ROTORUA. New Zealand Shipping Co. Length, 526 ft. 6 ins.; Gross Tonnage, 12,184; Funnel: Buff.



PRESIDENT ADAMS. Dollar Steamship Line. Length, 502 ft.; Gross Tonnage, 10,558;
PRESIDENT GARFIELD. ,, ,, ,, ,, ,, 10,558;
PRESIDENT HARRISON. ,, ,, ,, ,, ,, 10,533;
PRESIDENT HAYES. ,, ,, ,, ,, ,, 10,533;
PRESIDENT MONROE. ,, ,, ,, ,, ,, 10,533;
PRESIDENT POLK. ,, ,, ,, ,, ,, 10,533;
PRESIDENT VANBUREN. ,, ,, ,, ,, ,, 10 533;
Funnel: Black, White $ on Red Band.



BARONESA. Furness (Houlder). Length, 431 ft.; Gross Tonnage, 8,663;
Funnel: Black, Red Band, White Maltese Cross, Black Top.



NIEUW AMSTERDAM. Holland-America. Length, 615 ft.; Gross Tonnage, 17,149;
Funnel: Buff, White Band between Two Green.

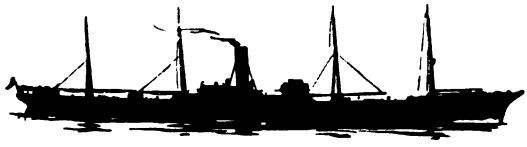


PRESIDENT ROOSEVELT. United States Shipping Board. Length, 535 ft.; Gross Tonnage, 14,127;
Funnel: Red, White Band, Blue Top, U.S.A. Shield on side.
PRESIDENT LINCOLN. PRESIDENT CLEVELAND. PRESIDENT PIERCE. PRESIDENT TAFT. PRESIDENT WILSON. Dollar Steamship Line.
Funnel: Black, White $ on Red Band.



M.S. SHROPSHIRE. Bibby Line. Length, 502 ft.; Gross Tonnage, 10,000;
Funnel: Salmon Pink, Black Top.

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COLONIA. **Telegraph Construction and Maintenance Co.** Length, 487 ft.; Gross Tonnage, 8,010; Funnel: Yellow.



YORKSHIRE. **Bibby Line.** Length, 482 ft. 4 ins.; Gross Tonnage, 10,250; Funnel: Salmon Pink, Black Top.



LANCASHIRE. **Bibby Line.** Length, 482 ft. 4 ins.; Gross Tonnage, 9,445; Funnel: Salmon Pink, Black Top.



DIPLOMAT. **Harrison Line.** Length, 482 ft.; Gross Tonnage, 8,218; Funnel: Black, Red Band between Two White.



DOMINIA. **Telegraph Construction and Maintenance Co.** Length, 475 ft; Gross Tonnage, 9,250; Funnel: Yellow.



OXFORDSHIRE. **Bibby Line.** Length, 474 ft. 7 ins Gross Tonnage, 8,624; Funnel: Salmon Pink, Black Top.

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WARWICKSHIRE. Bibby Line. Length, 470 ft. 3 ins.; Gross Tonnage, 8,012; Funnel: Salmon Pink, Black Top.



LEITRIM. Union Steam Ship Co. of N.Z. Length, 470 ft.; Gross Tonnage, 9,540; Funnel: Red, Black Top.



GLOUCESTERSHIRE. Bibby Line. Length, 467 ft. 2 ins.; Gross Tonnage, 8,124; Funnel: Salmon Pink, Black Top.



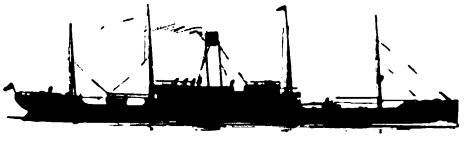
LEICESTERSHIRE. Bibby Line. Length, 467 ft. 2 ins.; Gross Tonnage, 8,059; Funnel: Salmon Pink, Black Top.



COLLEGIAN. Harrison Line. Length, 455 ft.: Gross Tonnage, 5,850; Funnel: Black, Red Band between Two White.



HEREFORDSHIRE. Bibby Line. Length, 452 ft. 3 ins.; Gross Tonnage, 7,192; Funnel: Salmon Pink, Black Top.



DERBYSHIRE. Bibby Line. Length, 452 ft.; Gross Tonnage, 6,776; Funnel: Salmon Pink, Black Top.

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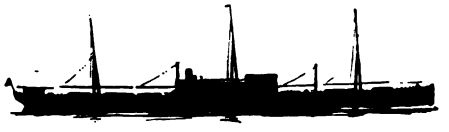
HYACINTHUS. HYPATIA. Houston Line. Length, 452 ft.; Gross Tonnage, 5,725; Funnel: Red, Black Top, Two Black Bands.



MAUL. Matson Navigation Co. Length 484 ft.; Gross Tonnage, 9,801; Funnel: Yellow, Black Top, with "M."



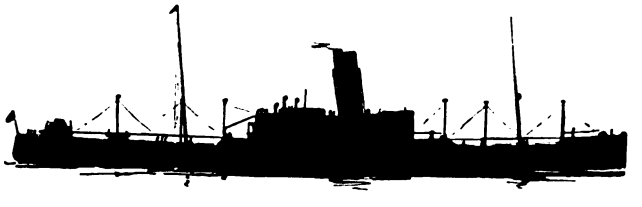
MANUEL CALVO. Compañia Trasatlantica. Length 435 ft.; Gross Tonnage, 5,617; Funnel: Black.



M.S. BALBOA. M.S. BUENOS AIRES. M.S. CANADA. Axel Axelson Johnson. Length, 426 ft.; Gross Tonnage, 5,455.



MONTEVIDEO. Compañia Trasatlantica. Length, 422 ft.; Gross Tonnage, 5,205; Funnel: Black.



MINNETONKA. MINNEWASKA. Atlantic Transport. Length, 626 ft.; Gross Tonnage, 21,998; Funnel: Red, Black Top.

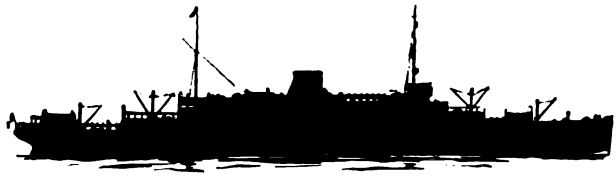


CARINTHIA. FRANCONIA. Cunard. Length, 600 ft.; Gross Tonnage, 20,158; Funnel: Red, Black Top.

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LACONIA. SAMARIA. SCYTHIA. Cunard. Length, 600 ft.; Gross Tonnage, 20,158;
Funnels: Red, Black Top.



M.S. SATURNIA. M.S. VULCANIA. Cosulich Line. Length, 599 ft.; Gross Tonnage, 23,900;
Funnel: Red, White Band and Black Top.



LANCASTRIA. Cunard. Length, 578 ft.; Gross Tonnage, 16,700;
Funnel: Red, Black Top.

CAMERONIA Anchor Henderson. Length, 552 ft. 5 ins.; Gross Tonnage, 16,280;
Funnel: Black.



M.S. CHRISTIAAN HUYGENS. Stoomvaat Maatschappij Nederland. Length, 570 ft.;
Gross Tonnage, 15,630;
Funnels: Buff, Black Top.



EURIPIDES. White Star—Aberdeen Line. Length, 570 ft.; Gross Tonnage, 15,000;
Funnel: Ochre.



NESTOR. ULYSSES. Blue Funnel Line. Length, 563 ft. 2 ins.; Gross Tonnage, 14,547;
Funnel: Blue, Black Top.

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NOORDAM. RIJNDAM. Holland-America. Length, 560 ft. ; Gross Tonnage, 12,529 ; Funnel : Buff, White Band between Two Green.



MEGANTIC. White Star. Length, 550 ft. 4 ins. ; Gross Tonnage, 14,878 ; Funnel : Buff, Black Top.



ALMANZORA. Royal Mail Steam Packet Co. Length, 550 ft. 3 ins. ; Gross Tonnage, 16,034 ; Funnel : Buff.



ORDUNA. Royal Mail Steam Packet Co. Length, 550 ft. 3 ins. ; Gross Tonnage, 15,499 ; Funnel : Buff.



ORBITA. Royal Mail Steam Packet Co. Length, 550 ft. 3 ins. ; Gross Tonnage, 15,486 ; Funnel : Buff.



CALGARIC. White Star. Length, 550 ft. ; Gross Tonnage, 16,063 ; Funnel : Buff, Black Top.

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CALIFORNIA. TUSCANIA. Anchor Henderson. Length, 550 ft.; Gross Tonnage, 17,250; Funnel: Black.



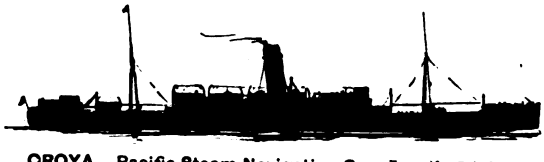
MOLDAVIA. MONGOLIA. P. & O. Line. Length, 550 ft.; Gross Tonnage, 15,800; Funnel: Black



BETHORE. Ore Steamship Co., N.Y. Length, 550 ft.; Gross Tonnage, 14,899; Funnel: Grey, Blue and White Bands, White O.



ESPERANCE BAY. HOBSONS BAY. JERVIS BAY. LARGS BAY. MORETON BAY. Aberdeen Commonwealth Line. Length, 548 ft.; Gross Tonnage, 16,500; Funnels: Yellow.



OROYA. Pacific Steam Navigation Co. Length, 547 ft.; Gross Tonnage, 14,000; Funnel: Buff.



OROPESA. Pacific Steam Navigation Co. Length, 530 ft.; Gross Tonnage, 14,072; Funnel: Buff.



SAN LORENZO. SAN MELITO. SAN PATRICIO. Eagle Oil Transport Co. Length, 527 ft. 3 ins.; Gross Tonnage, 11,929; Funnel: Black, Yellow Band, Black Eagle, Black O on White Band, Yellow Band.

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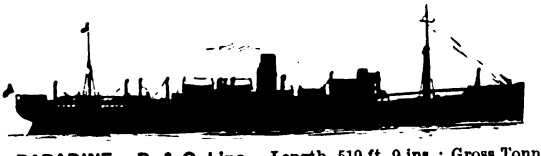
MARLOCH. **Canadian Pacific.** Length, 520 ft.; Gross Tonnage, 10,600;
Funnel: Yellow.



THENIA. **LETITIA.** **Anchor-Donaldson.** Length, 520 ft.; Gross Tonnage, 12,000;
Funnel: Black, White Band, Black Top.



M.S. PIETER CORNELISZOON HOOFT. **Stoomvaart Maatschappij Nederland.**
Length, 520 ft.; Gross Tonnage, 14,642;
Funnel: Buff, Black Top.



BARADINE. **P. & O. Line.** Length, 519 ft. 9 ins.; Gross Tonnage, 13,300;
Funnel: Black.



MATAROA. **TAMAROA.** **Shaw, Savill and Albion.** Length, 518 ft.;
Gross Tonnage, 12,500;
Funnel: Buff, Black Top.

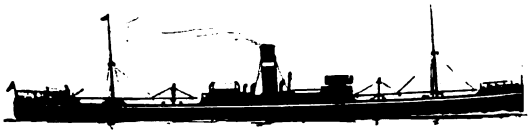


MANGALORE. **MATHURA.** **Anchor Brocklebank.** Length, 518 ft. Gross Tonnage, 9,571;
Funnel: Black, White Band, Blue and White Stripe Band, Black Top.



MALANCHA. **Anchor Brocklebank.** Length, 518 ft.; Gross Tonnage, 10,572;
Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

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MACHARDA. Anchor-Brocklebank. Length, 518 ft.; Gross Tonnage, 10,464;
Funnel: Black, White Band, Blue and White Stripe Band, Black Top.



DROTTNINGHOLM. Swedish American Line. Length, 517 ft.; Gross Tonnage, 12,522;
Funnel: Yellow Blue Disc, Three Gold Crowns.



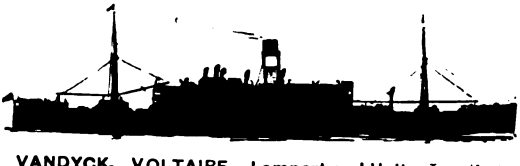
FUSHIMI MARU. SUWA MARU. Nippon Yusen Kaisha. Length, 516 ft.;
Gross Tonnage, 10,938;
Funnel: Black.



ARAGUAYA. Royal Mail Steam Packet Co. Length, 515 ft. 2 ins.; Gross Tonnage, 10,530;
Funnel: Buff.



ORCOMA. Pacific Steam Navigation Co. Length, 511 ft. 7 ins.; Gross Tonnage, 11,571;
Funnel: Buff.



VANDYCK. VOLTAIRE. Lamport and Holt. Length, 510 ft.; Gross Tonnage, 13,233;
Funnel: Blue, White Band. Black Top.

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ACHILLES. PHILOCTETES. TYNDAREUS. Blue Funnel Line. Length, 507 ft.; Gross Tonnage, 11,426; Funnel: Blue, Black Top.



DEMOSTHENES. THEMISTOCLES. White Star Aberdeen Line. Length, 506 ft. 6 ins.; Gross Tonnage, 11,223; Funnel: Ochre.



PORT MELBOURNE. PORT NAPIER. PORT SYDNEY. Commonwealth and Dominion Line. Length, 501 ft. 3 ins.; Gross Tonnage, 9,152; Funnel: Red, Black Top.



DARRO. DEMERARA. DESEADO. DESNA. Royal Mail Steam Packet Co. Length, 500 ft. 7 ins.; Gross Tonnage, 11,477, Funnel: Buff.



LLANSTEPHAN CASTLE. Union Castle Line. Length, 500 ft. 5 in.; Gross Tonnage, 11,293; Funnel: Red, Black Top.



BELTANA. BENALLA. BERRIMA. BORDA. P. & O. Line. Length, 500 ft.; Gross Tonnage, 11,120; Funnel: Black.

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FERNDALE. FORDSDALE. Aberdeen Commonwealth Line. Length, 500 ft. ; Gross Tonnage, 9,674 ; Funnel : Yellow.



ALFONSO XIII. CRISTOBOL COLON. Compañia Trasatlantica. Length, 500 ft. ; Gross Tonnage, 10,322 ; Funnel : Black.



GLENIFFER. Glen Line. Length, 500 ft. ; Gross Tonnage, 9,429 ; Funnel : Red, Black Top.



M.S. INDRAPOERA. Rotterdam Lloyd. Length, 500 ft. ; Gross Tonnage, 10,500 ; Funnel : Black.



MAGDAPUR. MANIPUR. Anchor-Brocklebank Line. Length, 499 ft. 6 ins. ; Gross Tonnage, 9,237 ; Funnel : Black, White Band, Blue and White Stripe Band, Black Top.



INFANTA ISABEL DE BORBON. Compania Trasatlantica. Length, 498 ft. ; Gross Tonnage, 10,348 ; Funnel : Black.

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REINA VICTORIA EUGENIA. Compañia Trasatlantica. Length, 498 ft. ; Gross Tonnage, 10,137 ; Funnel : Black.



BEAVER BRAE. BEAVER BURN. BEAVER DALE. BEAVER HILL. Canadian Pacific. Length, 495 ft. : Gross Tonnage, 10,500 ; Funnel : Yellow.



HAKONE MARU. HAKOZAKI MARU. HARUNA MARU. Nippon Yusen Kaisha. Length, 495 ft. ; Gross Tonnage, 10,420 ; Funnel : Black.



AENEAS. ANCHISES. ASCANIUS. Blue Funnel Line. Length, 493 ft. ; Gross Tonnage, 10,049 ; Funnel : Blue, Black Top.



ANTENOR. HECTOR. SARPEDON. Blue Funnel Line. Length, 491 ft. ; Gross Tonnage, 11,400.



CALCHAS. DIOMED. MENELAUS. PERSEUS. Blue Funnel Line. Length, 490 ft. 8 ins. ; Gross Tonnage, 10,304 ; Funnel : Blue, Black Top.

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LLANDAFF CASTLE. Union Castle Line. Length, 490 ft. ; Gross Tonnage, 10,000 ;
Funnel : Red, Black Top.



CITY OF NAGPUR. Ellerman City Line. Length, 490 ft. ; Gross Tonnage, 10,138 ;
Funnel : Buff, White Band, Black Top.



CITY OF EXETER. Ellerman City Line. Length, 486 ft. 7 ins. ; Gross Tonnage, 9,447 ;
Funnel : Buff, White Band, Black Top.



REMUERA. New Zealand Shipping Co. Length, 485 ft. ; Gross Tonnage, 11,276 ;
Funnel : Yellow.



M.S. GLENAPP. M.S. GLENBEG. M.S. GLENGARRY. M.S. GLENOGLE. Glen Line.
Length, 485 ft ; Gross Tonnage, 6,802 ;
Funnel : Red, Black Top.

M.S. DINTELDYK. Holland Amerika. Length, 485 ft. ; Gross Tonnage, 8,400 ;
Funnel : Buff, Two Blue Bands, White between, Buff Top.

M.S. LOCHKATRINE. Royal Mail Steam Packet Co. Length, 485 ft. ; Gross Tonnage, 9,409 ;
Funnel : Buff.



CITY OF PARIS. Ellerman City Line. Length, 484 ft. 7 ins. ; Gross Tonnage, 10,245 ;
Funnel : Buff, White Band, Black Top.

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CEYLAN. MALTE. Chargeurs Réunis. Length, 483 ft.; Gross Tonnage, 9,000;
Funnel: Yellow, Red Stars on White Band.

NIAGARA. Cie. Générale Transatlantique.
Funnel: Red, Black Top.



FORMOSE, GROIX, HOEDIC. Chargeurs Réunis. Length, 481 ft. 6 ins.; Gross Tonnage, 10,500;
BELLE ISLE. ,, ,, ,, ,, ,, ,, 9,591;
AURIGNY. ,, ,, ,, ,, ,, ,, 9,589;
DESIRADE, EUBEE. ,, ,, ,, ,, ,, ,, 9,580;
Funnel: Yellow, Red Stars on White Band.

COMPEIGNE. CHANTILLY. Messageries Maritimes.
Funnel: Black.



PORT ADELAIDE. PORT AUCKLAND. PORT BOWEN. PORT CAMPBELL. PORT CAROLINE. PORT DARWIN. PORT DENISON. PORT HUNTER. PORT KEMBLA. PORT NICHOLSON. Commonwealth and Dominion Line. Length, 481 ft. 2 ins.;
Gross Tonnage, 8,422;
Funnel: Red, Black Top.



MOSELLA. Cie. Sud Atlantique. Length, 481 ft.; Gross Tonnage, 10,500;
Funnel: Yellow, Black Top.

KERGUELIN. Chargeurs Réunis.
Funnel: Yellow, Red Stars on White Band.



RUAHINE. New Zealand Shipping Co. Length, 480 ft. 7 ins.; Gross Tonnage, 10,839;
Funnel: Yellow.

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NEURALIA. NEVASA. British India S.N. Co. Length, 480 ft. 5 ins. ; Gross Tonnage, 9,082 ;
Funnel : Black, Two White Bands, Black Top.



TURAKINA. New Zealand Shipping Co. Length, 480 ft. ; Gross Tonnage, 10,000 ;
Funnel : Yellow.



KASHGAR. KASHMIR. KALYAN. KARMALA. KHIVA. KHYBER. Peninsular and Oriental. Length, 479 ft. 9 ins. ; Gross Tonnage, 8,840 ;
Funnel : Black.



CITY OF SIMLA. Ellerman City Line. Length, 476 ft. 7 ins. ; Gross Tonnage, 9,468 ;
Funnel : Buff, White Band, Black Top.



IROQUOIS. Anglo-American Oil Co. Length, 476 ft. 3 ins. ; Gross Tonnage, 9,202 ;
Funnel : Red, Black Top.



AFRICSTAR. NAPIERSTAR. RODNEYSTAR. STUARTSTAR. Blue Star Line.
Length, 475 ft. 9 ins. ; Gross Tonnage, 10,646 ;
Funnel : Red, Black Tops, White Band on Black, Blue Star on White Disc on Red.

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M.S. PORT HUON. M.S. PORT FREMANTLE. M.S. PORT GISBORNE. Commonwealth and Dominion. Length, 475 ft. 6 ins.; Gross Tonnage, 8,000
Funnel: Red, Black Top.



DUNLUCE CASTLE. DURHAM CASTLE. Union Castle.
Length, 475 ft. 5 ins.; Gross Tonnage, 8,130;
Funnel: Red, Black Top.



ARIZONA MARU. ALABAMA MARU. AFRICA MARU. MANILA MARU. HAWAII MARU. Osaka Shosen Kaisha. Length, 475 ft. Gross Tonnage, 9,500;
Funnel: Black, Two White Bands, joined at Side.



MAIDAN. MAHSUD. MAIHAR MALAKAND. MANAAR. MATHERAN. Anchor-Brocklebank. Length, 470 ft. 4 ins.; Gross Tonnage, 8,077;
Funnel: Black, White Band, Blue and White Stripe Band. Black Top.



DELTA. Peninsular and Oriental. Length 470 ft. 3 ins.; Gross Tonnage, 8,097;
Funnel: Black.



MALAKUTA. Anchor-Brocklebank. Length, 470 ft. 2 ins.; Gross Tonnage, 7,205;
Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

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CALAMARES. **United Fruit Co.** Length, 470 ft. ; Gross Tonnage, 7,782 ;
PASTORES. ,, ,, ,, Length, 470 ft. ; Gross Tonnage, 7,242
Funnel : Buff, White Diamond on Red Band, Black Top.



M.S. ACCRA. **M.S. APAPA.** **Elder Dempster.** Length, 468 ft. ; Gross Tonnage, 12,000 ;
Funnel : Buff.



MADURA. **MALDA.** **MANTOLA.** **MATIANA.** **British India S.N Co.** Length, 465 ft. 2 ins. ;
Gross Tonnage, 8,975 ;
Funnel: Black, Two White Bands, Black Top



M.S. PORT DUNEDIN. **M.S. PORT HOBART.** **Commonwealth and Dominion Line.**
Length, 465 ft. ; Gross Tonnage, 7,500 ;
Funnel : Red, Black Top.



RAJULA. **ROHNA.** **British India Steam Navigation Co.** Length, 460 ft. ;
Gross Tonnage, 8478 ;
Funnel : Black, Two close White Bands.



ARAWA. **TAINUI.** **Shaw, Savill, and Albion Co.** Length, 460 ft. ; Gross Tonnage, 9,378
Funnel : Buff, Black Top.

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M.S. GULFCREST. Oil Tanker. Gulf Refining Co. of New York. Length, 460 ft.; Gross Tonnage, 8,950.



RIMUTAKA. RUAPEHU. New Zealand Shipping Co. Length, 457 ft. 6 ins.; Gross Tonnage, 8,887; Funnel: Yellow.



CITY OF LYONS. Ellerman Line. Length, 455 ft.; Gross Tonnage, 7,063; Funnel: Buff, White Band, Black Top.



AGAPENOR. AUTOLYCUS. AUTOMEDON. DARDANUS. ELPENOR. EUMAEUS. GLAUCUS. HELENUS. LYCAON. MACHAON. MENTOR. MERIONES. PHEMIUS. PYRRHUS. RHEXENOR. TEIRESIAS. TROILUS. Blue Funnel Line. Length, 455 ft. 2 ins.; Gross Tonnage, 7,587; Funnel: Blue, Black Top.



KONINGEN DER NEDERLANDEN. Stoomvaart Maatschappy Length, 455 ft.; Gross Tonnage, 8,300; Funnel: Buff, Black Top.



CLAN MACTAGGART. Clan Line. Length, 452 ft. 7 ins.; Gross Tonnage, 7,602;
CLAN MACTAVISH. " " Length, 469 ft.; Gross Tonnage, 7,619;
Funnel: Black, two Red Bands.

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GARTH CASTLE. GRANTULLY CASTLE. Union Castle.
Length, 452 ft. 6 ins.; Gross Tonnage, 7,715;
Funnel: Red, Black Top.



MANUEL ARNUS. Compañia Trasatlantica. Length, 451 ft. 6 ins.; Gross Tonnage, 7,578;
Funnel: Black.



M.S. ABA. M.S. ADDA. Elder Dempster. Length, 450 ft. 3 ins.; Gross Tonnage, 7,938;
Funnel: Buff.



M.S. DORSETSHIRE. M.S. SOMERSETSHIRE. Bibby Line.
Length, 450 ft. 3 ins.; Gross Tonnage, 7,500;
Funnel: Salmon Pink, Black Top.



SICILIA. SOUDAN. P. & O. Line. Length, 450 ft. 2 ins.; Gross Tonnage, 6,684;
Funnel: Black.



M.S. DOMALA. British India S.N. Co. Length, 450 ft.; Gross Tonnage, 8,441;
Funnel: Black, Two White Bands, Black Top.



CIRCASSIA. Anchor Henderson. Length, 450 ft.; Gross Tonnage, 7,180;
Funnel: Black.

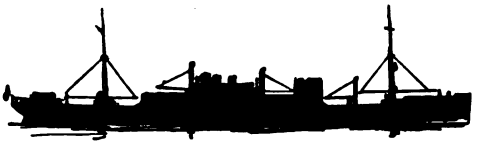
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LONDON MARU. PARIS MARU. Osaka Shosen Kaisha. Length, 450 ft. ; Gross Tonnage, 7,600 ; Funnel : Black, Two White Bands joined at Sides



MAKURA. Union Steam Ship Co. of N.Z. Length, 450 ft. ; Gross Tonnage, 8,075 ; Funnel : Red, Black Top.



M.S. ESQUILINO. M.S. VIMINALE. Lloyd Triestino. Length, 450 ft. ; Gross Tonnage, 10,000.



NANKIN. NOVARA. P. & O. Line. Length, 449 ft. 7 ins. ; Gross Tonnage, 7,058 ; Funnel : Black.



MASIRAH. Anchor-Brocklebank Line. Length, 448 ft. ; Gross Tonnage, 6,836 ; Funnel : Black, White Band, Blue and White Stripe Band, Black Top.



ANCHORIA. Anchor-Brocklebank Line. Length, 446 ft. 4 ins. ; Gross Tonnage, 6,112 ; Funnel : Black, White Band, Blue and White Stripe Band, Black Top.



MAHRATTA. MAKALLA. Anchor-Brocklebank Line. Length, 445 ft. ; Gross Tonnage, 6,690 ; Funnel : Black, White Band, Blue and White Stripe Band, Black Top.

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M.S. ASIATIC PRINCE. M.S. CHINESE PRINCE. M.S. JAPANESE PRINCE. M.S. JAVANESE PRINCE. M.S. MAYLAYAN PRINCE. Length, 440 ft.; Gross Tonnage, 10,000;
Funnel: Black, Two Red Bands, feathers on side.



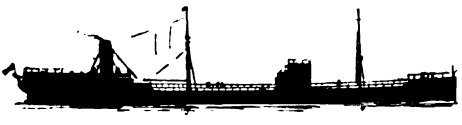
ANTONIO LOPEZ. Compañia Trasatlantica. Length, 440 ft ; Gross Tonnage, 5,975
Funnel: Black.



HILDEBRAND. Booth Line. Length, 440 ft. 3 ins.; Gross Tonnage, 6,995;
Funnel: Black.



ELYSIA. Anchor Henderson. Length, 440 ft.; Gross Tonnage, 6,368;
Funnel: Black.



BRITISH MERCHANT. British Tanker Co. Length, 440 ft.; Gross Tonnage, 7,400;
Funnel: Black, Two Red Bands, White Disc, B.T.C. in centre.



ZEELANDIA. Koninklijke Hollandsch Lloyd. Length, 440 ft.; Gross Tonnage, 7,995;
Funnel: Yellow, Black Band.



CLAN URQUHART. Clan Line. Length, 440 ft.; Gross Tonnage, 5,856;
Funnel: Black, Two Red Bands

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M.S. PACIFIC RELIANCE. M.S. PACIFIC ENTERPRISE. Furness Withy. Length, 435 ft.; Gross Tonnage, 6,570;
Funnels: Black, Red, Thin Black and Red Band, Black Top.



M.S. GLENAMOY. Glen Line. Length, 435 ft.; Gross Tonnage, 7,269;
Funnel: Red, Black Top.



CITY OF NORWICH. Ellerman (Hall Line). Length, 434 ft. 4 ins.; Gross Tonnage, 5,726.
Funnel: Buff, White Band, Black Top.



REINA MARIA CRISTINA. Compañia Trasatlantica. Length, 434 ft.; Gross Tonnage, 4,817;
Funnel: Black.



NAGINA. British India Steam Navigation Co. Length, 433 ft.; Gross Tonnage, 6,650;
Funnel: Black, Two White Bands.



TAKADA. TANDA. British India S.N.Co. Length, 430 ft. 1 in.; Gross Tonnage, 6,949;
Funnel: Black, Two White Bands, Black Top.



M.S. LEIGHTON. M.S. LINNELL. Lamport and Holt. Length, 430 ft.; Gross Tonnage, 7,412;
Funnel: Light Blue, White Band, Black Top.

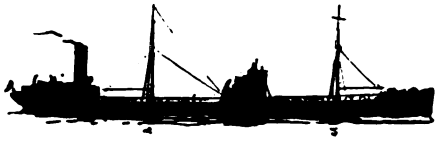
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M.S. UPWEY GRANGE. Furness-Houlder. Length, 430 ft.; Gross Tonnage, 9,100;
Funnel: Black, Red Band with White Maltese Cross, Black Top.



HARDWICKE GRANGE. Furness-Houlder. Length, 430 ft.; Gross Tonnage, 9,005;
Funnel: Black, Red Band with White Maltese Cross, Black Top.



BRITISH INVENTOR. British Tanker Co. Length, 430 ft.; Gross Tonnage, 7,200;
Funnel: Black, Two Red Bands, White Disc, B.T.C. in Centre.



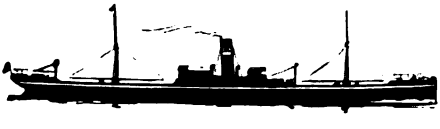
MARQUESA. Furness-Houlder. Length, 430 ft.; Gross Tonnage, 8,979;
Funnel: Black, Red Band with White Maltese Cross, Black Top.



BAYANO. CAMITO. CORONADO. Elders and Fyffes.
Length, 425 ft. 5 ins.; Gross Tonnage, 6,788;
Funnel: Buff, Black Top.



M.S. (Building). Blue Funnel Line. Length, 425 ft.; Gross Tonnage, 6,400;
Funnel: Blue, Black Top.



STOCKWELL. Anchor-Brocklebank Line. Length, 425 ft.; Gross Tonnage, 5,643;
Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

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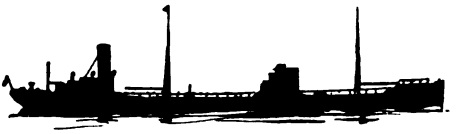
CAIRNROSS. Cairns, Noble & Co. Length, 425 ft. ; Gross Tonnage 5,494 ;
Funnel : Black, Red Band, White Triangle.



KARAGOLA. British India S.N. Co. Length, 425 ft. ; Gross Tonnage 7,053 ;
Funnel : Black, Two White Bands, Black Top.



TUSCARORA. Anglo-American Oil Co. Length, 425 ft. ; Gross Tonnage, 7,106 ;
Funnel : Red, Black Top.



M.S. NARRAGANSETT. Anglo American Oil Co.
Length, 425 ft. ; Gross Tonnage, 6,889 ;
Funnel : Red, Black Top.



BUENOS AIRES. Compañia Trasatlantica. Length, 422 ft. ; Gross Tonnage, 5,311;
Funnel : Black.



LEON XIII. Compañia Trasatlantica. Length, 421 ft. ; Gross Tonnage, 5,086 ;
Funnel : Black.



KAROOLA. KATOOMBA. McIlwraith, McEacharn. Length, 420 ft. 5 ins.;
Gross Tonnage, 7,391 ;
Funnel : Red, Black Top.

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MARAMA. **Union Steamship Co. of N.Z.** Length, 420 ft. 3 ins. ; Gross Tonnage, 6,497 ;
Funnel : Red, Black Top.



SAN DUNSTANO. SAN EDUARDO. SAN RICARDO. SAN SILVESTRE. SAN TIRSO. SAN VALERIO. SAN ZEFERINO. **Eagle Oil Transport Co., Ltd.**
Length, 420 ft. 2 ins. ; Gross Tonnage, 6,220 ;
Funnel : Black, Yellow Band, Black Eagle, Black O on White Band, Yellow Band.



ALNMOOR. CASTLEMOOR. **Runciman.** Length, 420 ft. ; Gross Tonnage, 6,573 ;
Funnel : Black, White Band, Blue R.



CAIRNVALONA. **Cairns, Noble & Co.** Length, 415 ft. 2 ins. ; Gross Tonnage, 4,929 ;
Funnel : Black, Red Band, White Triangle.



LADY DRAKE. LADY HAWKINS. LADY NELSON. **Canadian National (West Indies) Steamships, Ltd.** Length, 415 ft. ; Gross Tonnage, 7,650 ;
Funnel : Red, White Band, Blue Top.



LADY RODNEY and LADY SOMERS. **Canadian National Steamships.** Length, 415 ft.
Gross Tonnage, 7,650 ;
Funnel : Red, White Band, Blue Top.

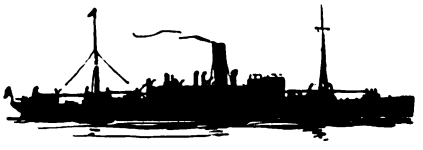
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D'ENTRECASTEAUX. FORBIN. Chargeurs Réunis. Length, 415 ft.; Gross Tonnage, 7,563;
DUPLEIX. ,, ,, ,, ,, ,, 7,418;
ANGO. ,, ,, ,, ,, ,, 7,393;
BOUGAINVILLE. ,, ,, ,, 413 ft.; ,, 7,293;
Funnel: Yellow, Red Stars on White Band.



MUNARGO. Munson Steamship Co. Length, 415 ft.; Gross Tonnage, 6,484;
Funnel: Blue, White Band, Black Top.



BELVIDERE. Cosulich Line. Length, 412 ft.; Gross Tonnage, 7,305;
Funnel: Red, White Band, Black Top.



FORT ST. GEORGE. FORT VICTORIA. Furness Withy. Length, 411 ft. 3 ins.;
Gross Tonnage, 7,785;
Funnel: Black, Red, Thin Black and Red Bands, Black Top.



ERINPURA. British India S.N. Co. Length, 411 ft.; Gross Tonnage, 5,128;
Funnel: Black, Two White Bands, Black Top.



ZEALANDIA. Huddart, Parker. Length, 410 ft.; Gross Tonnage, 7,000
Funnel: Yellow.

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CLAN MACNAB. CLAN MACNAIR. CLAN MACNAUGHTON. CLAN MACNEIL. CLAN MONROE. CLAN MORRISON. CLAN MURDOCH. CLAN MURRAY. Clan Line.
Length, 410 ft. 6 ins.; Gross Tonnage, 6,114;
Funnel: Black, Two Red Bands.



MEDIA. Anchor-Brocklebank. Length, 410 ft.; Gross Tonnage, 5,437;
Funnel: Black, White Band, Blue and White Stripe Band, Black Top.



OCEAN PRINCE. Furness Withy. Length, 410 ft.; Gross Tonnage, 5,212;
Funnel: Black, Red, Thin Black and Red Bands, Black Top.



ELLENGA. British India S.N. Co. Length, 410 ft.; Gross Tonnage, 5,196;
Funnel: Black, Two White Bands, Black Top.



DRAMATIST. Harrison Line. Length, 410 ft.; Gross Tonnage, 5,443;
Funnel: Black Red Band between Two White.



C. LOPEZ Y LOPEZ. Compañia Trasatlantica. Length, 408 ft.; Gross Tonnage, 4,170;
Funnel; Black.



EGBA. Elder Dempster. Length, 406 ft.; Gross Tonnage, 4,989;
Funnel: Buff.

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EBOE. Elder Dempster. Length, 405 ft. 1 in.; Gross Tonnage, 4,866; Funnel: Buff.



HIGHLAND LADDIE. Nelson. Length, 405 ft.; Gross Tonnage, 7,281;
HIGHLAND LOCH. ,, Length, 413 ft.; Gross Tonnage, 7,493;
HIGHLAND PIPER. ,, Length, 413 ft.; Gross Tonnage, 7,490;
Funnel: Red, Two White Bands, Black Between, Black Top.



NEWFOUNDLAND. Warren Line (Furness Withy). Length, 405 ft.; Gross Tonnage, 6,820; Funnel: Black, Red, Thin Red and Black Bands.



M.S. LOUISIANA. Det Forenede Dampskibs Selskab. Length, 405 ft.; Gross Tonnage, 6,513; Funnel: Flamingo, Red, Black Top.



DAGHESTAN. Oil Tanker. Hindustan Steam Shipping Co. Length, 405 ft.; Gross Tonnage, 5,742;
Funnel: Black, Two White Bands, Vermilion Between, C in White.



M.S. GLENLUCE. M.S. GLENTARA. Glen Line. Length, 405 ft.; Gross Tonnage, 6,755; Funnel: Red, Black Top.



KALIMBA. ROMERA. Maclay and McIntyre. Length, 402 ft. 3 ins.; Gross Tonnage 4892; Funnel: Yellow, Black Top.

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BREDA. Koninklijke Nederlandsche Stoomboot Mij. Length, 402 ft.; Gross Tonnage, 6,915; Funnel: Black, Two White Bands.



CAIRNESK. CAIRNGLEN. Cairn Line. Length, 401 ft. 9 ins.; Gross Tonnage, 5,000; Funnel: Black, White Diamond on Red Band.



HOLYWELL. Anchor-Brocklebank. Length, 401 ft. 8 ins.; Gross Tonnage, 4,867; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.



HALIZONES. Houston Line. Length, 400 ft. 8 ins.; Gross Tonnage, 5,273; Funnel: Red, Two Black Bands Black Top.



ABINSI. Elder Dempster. Length, 400 ft. 5 ins.; Gross Tonnage, 6,365; Funnel: Buff.



NORWEGIAN. Leyland Line. Length, 400 ft. 2 ins.; Gross Tonnage, 6,357; Funnel: Buff, Black Top.



MANISTEE. PATIA. ZENT. Elders and Fyffes. Length, 400 ft. 2 ins.; Gross Tonnage, 5,360; Funnel: Buff, Black Top.

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EDAVANA, ELEPHANTA. **British India S. N. Co.** Length, 400 ft.; Gross Tonnage, 5,284; Funnel: Black, Two White Bands, Black Top.



CANADIAN VICTOR. **Canadian Government Merchant Marine.** Length, 400 ft.; Gross Tonnage, 5,493; Funnel: Yellow, Black Top.



M.S. DOLIUS. M.S. MEDON. **Blue Funnel Line.** Length, 400 ft.; Gross Tonnage, 5,700; Funnel: Blue, Black Top.



ORANGEMOOR. **Runciman.** Length, 399 ft. 6 ins.; Gross Tonnage, 6,573; Funnel: Black, White Band, Blue R.



CAIRNDHU. **Cairns, Noble & Co.** Length, 399 ft. 3 ins.; Gross Tonnage, 5,250;
CAIRNGOWAN. " " Length, 400 ft.; Gross Tonnage, 5,295;
Funnel: Black, Red Band, White Triangle.



M.S. LULE. **Grängesberg Oxelösund Co.** Length, 399 ft.; Gross Tonnage, 5,630; Funnel: Buff, Blue Band, Gold Emblem.



BAOULE.
DAHOMEY } **Chargeurs Réunis.** Length, 391 ft.; Gross Tonnage, 5,900;
ADRAR.
Funnel: Yellow, Red Stars on White Band. " " 5,855;

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ANGORA. British India S.N. Co. Length, 390 ft. 8 ins.; Gross Tonnage, 4,298; Funnel: Black, Two White Bands, Black Top.



CAIRNMONA. Cairns, Nobie & Co. Length, 390 ft. 2 ins.; Gross Tonnage, 4,666; Funnel: Black, Red Band, White Triangle.



ARONDA. British India S.N. Co. Length, 390 ft. 2 ins.; Gross Tonnage, 4,062; Funnel: Black, Two White Bands, Black Top.



VARELA. VARSOVA. VITA. British India S.N. Co. Length, 390 ft. 1 in.; Gross Tonnage, 4,645; Funnel: Black, Two White Bands, Black Top.



AMIRAL NEILLY. AMIRAL PONTY. AMIRAL LATOUCHE TREVILLE. Chargeurs Réunis. Length, 389 ft. 5 ins.; Gross Tonnage, 5,582; Funnel: Yellow, Red Stars on White Band.



OLJAREN. Transatlantic S.S. Co. Length, 389 ft.; Gross Tonnage, 5,450; Funnel: Yellow, Black Top.



LEGAZPI. Compañia Trasatlantica. Length, 389 ft.; Gross Tonnage, 4,339; Funnel: Black.

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HALESIUS. Houston Line. Length, 385 ft. ; Gross Tonnage, 4,652 ;
Funnel : Red, Two Black Bands, Black Top.



HESPERIDES. Houston Line. Length, 382 ft. 5 ins. ; Gross Tonnage, 3,914 ;
Funnel : Red, Two Black Bands, Black Top.



DENIS. STEPHEN. Booth Line. Length, 376 ft. 4 ins. ; Gross Tonnage, 4,435 ;
Funnel : Black.



AIDAN. Booth Line. Length, 375 ft. 9 ins. ; Gross Tonnage, 4,545 ;
Funnel : Black.



ALBAN. Booth Line. Length, 375 ft. 2 ins. ; Gross Tonnage, 5,223 ;
Funnel : Black.



ISLA DE PANAY. Compañia Trasatlantica. Length, 373 ft. ; Gross Tonnage, 3,484 ;
Funnel : Black.



ALICANTE. Compañia Trasatlantica. Length, 372 ft. 2 ins. ; Gross Tonnage, 3,879 ;
Funnel : Black.

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M.S. ITAPAGÉ. S.S. ITAIMBÉ. S.S. ITAHITÉ. Companhia Nacional Di Navegaçao Costiero. Length, 370 ft.; Gross Tonnage, first named, 4,600 tons; others, 4,993; Funnels: Black, Brass Maltese Cross.



M.S. ITAPÉ. Companhia Nacional di Navigaçao Costiero Length, 370 ft.; Gross Tonnage, 5,000; Funnel: Black, Brass Maltese Cross.



EUROPE. Chargeurs Réunis. Length, 369 ft.; Gross Tonnage, 5,453; Funnel: Yellow, Red Stars on White Band.



SANTA AURORA. Eagle Oil Transport Co., Ltd. Length, 367 ft. 5 ins.; Gross Tonnage, 4,278; Funnel: Black Yellow Band, Black Eagle, Black O on White Band, Yellow Band.



HESIONE. Houston Line. Length, 361 ft. 7 ins.; Gross Tonnage, 4,125; Funnel: Red, Black Top.



M.S. STELLA POLARIS. Bergen Steamship Co. Length, 360 ft.; Gross Tonnage, 5,020; Funnel: Yellow.



JOHN W. MACAY. Commercial Cable Co., N.Y. Length, 360 ft.; Gross Tonnage, 4,049; Funnel: Buff, Black Top.

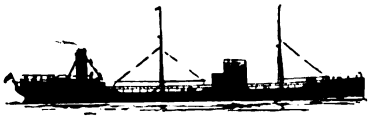
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BEN MY CHREE. Isle of Man Steam Packet Co. Length, 355 ft.; Gross Tonnage, 2,587; Funnel: Red, Black Top.



CUTHBERT. Booth Line, Length, 355 ft.; Gross Tonnage, 3,843; Funnel: Black.



BRITISH COMMERCE. BRITISH ENTERPRISE. BRITISH TRADER. British Tanker Co. Length, 351 ft. 4 ins.; Gross Tonnage, 4,205; Funnel: Black, Two Red Bands, White Disc, B.T.C. in centre.



CHANGTE. Australian-Oriental Line. Length, 350 ft.; Gross Tonnage, 4324; Funnel: Black.



REGELE CAROL I. Roumanian State. Length, 350 ft.; Gross Tonnage, 2,370; Funnel: White, Black Top.



M.S. MALIA. Anchor Brocklebank. Length, 350 ft. 5 ins.; Gross Tonnage, 3,872; Funnel: Black, White Band, Blue and White Striped Band, Black Top.



POLYCARP. Booth Line. Length, 340 ft. 7 ins.: Gross Tonnage, 3,577; Funnel: Black.

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BARODA. British India S.N. Co. Length, 330 ft. 4 ins.; Gross Tonnage, 5,172; Funnel: Black, Two White Bands, Black Top.



ISLE OF THANET. MAID OF KENT. Southern Railway. Length, 329 ft.; Gross Tonnage, 2,664; Funnel: White, Black Top.



LA PERLA. M.S. LA MAREA. M.S. LA PLAYA. United Fruit Co. ength, 325 ft.; Gross Tonnage, 3,830; Funnel: Buff, White Diamond on Red Bank, Black Top.



SLIEVE BAWN. SLIEVE MORE. London, Midland and Scottish Railway. Length, 300 ft. 2 ins.; Gross Tonnage, 1,061; Funnel: Yellow, Black Top.



SLIEVE DONARD. London, Midland and Scottish Railway. Length, 300 ft.; Gross Tonnage, 1,116; Funnel: Yellow, Black Top.



SNOWDEN. London, Midland and Scottish Railway. Length, 299 ft. 9 ins.; Gross Tonnage, 1021; Funnel: Yellow, Black Top.



SLIEVE GALLION. London, Midland and Scottish Railway. Length, 299 ft. 5 ins.; Gross Tonnage, 1,071; Funnel: Yellow, Black Top.

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PRINCESS ADELAIDE. **Canadian Pacific.** Length, 290 ft. 5 ins. Gross Tonnage, 3,061; Funnel: Yellow.



M.S. DUMRA. **British India S.N. Co.** Length, 280 ft.; Gross Tonnage, 2,000; Funnel: Black, Two White Bands, Black Top.



CADILLAC. SARANAC. **Anglo American Oil Co.** Length, 530 ft. 2 ins.; Gross Tonnage, 12,074; Funnel: Red, Black Top.

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DIMENSIONS AND PARTICULARS
OF
BRITISH AND FOREIGN WARSHIPS.

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LIST OF BRITISH AND FOREIGN SHIPS.

Warships are arranged alphabetically, except in certain cases in which vessels of the same class have been kept together. The following abbreviations are used throughout the List:—

a.c.	Armoured cruiser.	g.v.	Gun-vessel.
a.g.b.	Armoured gunboat.	H.A.	High angle = A.A. Anti-aircraft.
b.	Battleship.	H.N.S.	Harvey nickel steel.
b.c.	Battle-cruiser.	H.S.	Harveyised or similar hard-faced steel.
l.cr.	Light cruiser.	K.S.	Krupp steel.
Flot. ldr.	Flotilla leader.	p.v.	Patrol vessel.
c.d.s.	Coast-defence ship.	*t.*	Turret-ship (in class column).
P. L. Cr.	Protected light cruiser.	*t.*	Speed and H.P. at trials (in speed and H.P. columns).
M.Cr.	Minelaying cruiser.	to.cr.	Torpedo-cruiser.
cr.	Cruiser.	to.g.b.	Torpedo-gunboat.
A.A.	Anti-aircraft guns. (H.A. = High angle)		
A.C.	Aircraft carrier.		
A.T.	Aircraft tender.		
g.b.	Gunboat.		

L. Light guns under 15 cwt., including boats' guns.
M. Machine guns.
sub. Submerged torpedo tube.

The following abbreviations are used to distinguish the various types of boilers:—

W.T.	Water-tube boilers, where the type is not known.	My.	Myabara.
B.	Belleville.	N. or Nic.	Niclausse.
Bl.	Blechynden.	Nor.	Normand.
B. & W.	Babcock and Wilcox.	N.S.	Normand-Sigaudy.
D'A.	D'Allest.	T.	Thornycroft.
		T.S.	Thornycroft-Schulz.
		Y^1.	Yarrow small tube.
		Y^2.	Yarrow large tube.

The following abbreviations distinguish types of turbines:—

P.T. Parsons.	C.T. Curtis.
(G.) Geared turbines.	B.C.T. Brown-Curtis.

A reference is now given in the tables to the pages on which diagrams of the ships appear.

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GREAT BRITAIN.—Armoured Ships.

s.	NAME. / DATE FOR SCRAPPING.	Standard Displacement. (Washington Treaty.)	Length. (Extreme.)	Beam. (Extreme.)	Normal Draught.	Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.	in.	in.	in.	in.			knots.	tons	
b.	**Barham** . . 1935 *See p.* 379.	30,000	643¾	90 6	31 3	75,000 B. & W.	Clydeb'nk	J. Brown B.C.T.	1914	1915	2,408,000	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *4-in.* A.A., 4 *3-pr.*; 5 M.; 10 L.	4 (sub.)	25	— / 3400	1126
b.	**Benbow** . . 1934 *See p.* 380.	26,250	623¾	90 0	28 0	29,000 B. & W.	Dalmuir .	Beardmore P.T.	1913	1914	2,027,115*	12–8	1–2½	9–8	1–1½	11	6	10 *13·5-in.*, 12 *6-in.*, 4 *3-pr.* 2 *3-in.* A.A.; 5 M.; 10 L.	4 (sub.)	21	3250 / 1050	1147
b.	**Emperor of India** . 1934 *See p.* 380.	26,250	624½	90 0	28 0	29,000 Y.	Barrow .	Vickers . P.T.	1913	1914	2,020,017*	12–8	1–2½	9–8	1–1½	11	6	10 *13·5-in.*, 12 *6-in.*, 4 *3-pr.*, 2 *3-in.* A.A.; 5 M.; 10 L.	4 (sub.)	21	3250 / 1050	1145
	Hood . . 1941 *See p.* 381.	42,100	860¾	105 3	28 6	144,000	Clydeb'k	J. Brown . B.C.T. (G.)	1918	1920	5,843,039*	12–6	3–1	7–5	5–4	11	(*a*)	8 *15-in.*, 12 *5·5-in.*, 4 *4-in.* A.A., 4 *3-pr.*; 5 M.; 10 L.	4 (deck) 2 (sub.)	31	— / 4000	1341
b.	**Iron Duke** . . 1934 *See p.* 380.	26,250	623¾	90 0	28 0	29,000 B. & W.	Portsm'th	Cammell Laird P.T.	1912	1914	2,080,918	12–8	1–2½	9–8	1–1½	11	6	10 *13·5-in.*, 12 *6-in.*, 4 *3-pr.* 2 *3-in.* A.A.; 5 M.; 10 L.	4 (sub.)	21	3250 / 1050	1168
b.	**Malaya**¶ . . 1936 *See p.* 379.	30,000	640½	90 9	31 3	75,000 B. & W.	Walker .	Wallsend . P.T.	1915	1916	¶	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4 (sub.)	25	— / 3400	1136

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b.	**Marlborough.** 1934 *See p. 380.*	26,250	623	90	0	28	0	29,000 Y²	Devonport	Hawthorn P.T.	1912	1914	2,043,437	12–8	1–2½	9–8	1–1½	11	6	10 *13·5-in.*, 12 *6-in.*, 4 *3-pr.*, 2 *3-in.* A.A.; 5 M.; 10 L.	4 (sub.)	21	3250 / 1050	1145
b.	**Nelson.** 1942 *See p. 377.*	35,000	710	106	0	30	0	45,000	N'wc'stle-on-Tyne	Wallsend.	1925	1927	7,000,000*	..	..	..	..	..	..	9 *16-in.*, 12 *6-in.*, 6 *4·7-in.* A.A.; 4 *3-pr.*, 8 *2-pr.*	..	23	— / 3750	1360
b.	**Queen Elizabeth** 1935 *See p. 379.*	31,100	644½	‡104	0	31	3	75,000 B. & W.	Portsm'th	Wallsend P.T.	1913	1915	2,943,000	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4 (sub.)	25	— / 3400	1187
b.	**Ramillies.** 1941 *See p. 378.*	29,150	620½	‡101	6	29	0	40,000 Y.	Dalmuir	Beardmore, P.T.	1916	1917	3,295,800	13–6	4–1	6	6–4	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4	23	— / 3170	1010
b.	**Resolution** 1937 *See p. 378.*		620½	‡101	4				Jarrow	Palmer P.T.	1915	1916	2,449,680											1012
b.	**Revenge** 1937 *See p. 378.*		625¾	‡101	5				Barrow	Vickers P.T.	1915	1916	2,406,500											1104
b.	**Royal Oak** 1938 *See p. 378.*		620½	‡102	1				Devonp'rt	Hawthorn P.T.	1914	1916	2,468,269											1149
b.	**Royal Sovereign** 1936 *See p. 378.*		620¾	‡102	0				Portsm'th	Parsons P.T.	1915	1916	2,570,929											1104
b.c.	**Renown** 1940	32,000	794½	102	4	25	6	112,000 B. & W.	Govan	Fairfield B.C.T.	1916	1916	3,111,284	6–3 K.C.	2	6–3	4–3	11–7 K.C.	6 K.C.	6 *15-in.*, 15 *4-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	2 (sub.) 8 a.w.	31·5	— / 4250	1240
b.c.	**Repulse** 1939 *See p. 382.*			102	6				Clydeb'nk	J. Brown B.C.T.	1916	1916	2,760,062											
b.	**Rodney.** 1942 *See p. 377.*	35,000	710	106	0	30	0	45,000	Birkenh'd	Cammell Laird	1925	1927	7,000,000*	..	..	..	..	..	..	9 *16-in.*, 12 *6-in.*, 6 *4·7-in.* A.A.; 4 *3-pr.*; 8 *2-pr.*	..	23	— / 3750	1315

* Total estimated cost of ship including guns.

‡ Over rubbers.
(*a*) Guns are in shields of 1-in. H.T. plating.

¶ Built at the charge of the Federated Malay States.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME. DATE FOR SCRAPPING.	Standard Displacement. (Washington Treaty.)	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.c.	**Tiger** . . 1935 *See p.* 383.	28,900	702	90 6	28 6	108,000 B. & W.	Clydeb'nk	J. Brown . B.C.T.	1913	1914	2,088,000*	9–3	3–1	6	4–2	9	6	8 *13·5-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *3-in.* A.A.; 5 M.; 10 L.	4 (sub.)	30	†2800 / 3480	1439
b.	**Valiant** . . 1939 *See p.* 379.	30,000	639¾	90 10	31 3	75,000 B. & W.	Govan	Fairfield . B.C.T.	1914	1916	2,537,037*	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4 (sub.)	25	— / 3400	1136
b.	**Warspite** . . 1935 *See p.* 379.	31,100	644½	104‡0	31 3	75,000 B. & W.	Devonp'rt	Hawthorn P.T.	1913	1915	2,518,360*	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4 (sub.)	25	— / 3400	1179

* Total estimated cost of ship, including guns.

† Total fuel carried not to exceed 4900 tons.

The dates placed under the names of ships indicate the years in which they are to be scrapped according to the Washington Treaty.
Fleet target ship Centurion, converted from battleship.

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GREAT BRITAIN.—Cruising Ships, &c.

Class.	NAME.	Standard Displacement. (Washington Treaty.)	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						£	in.		in.			knots.	tons.	
M.Cr.	Adventure *See p. 390.*	6,740	521	59 0	14 5	40,000	Devonp'rt	Vickers .	1924	1927	..	..		..	4 *4·7-in.* A.A., 4 *3-pr.*, 4 *2-pr.*, 2 M., 8 L.	..	27¾	— / 1550	..
A.C.	Argus	14,000	566	75 9	21 0	20,000	Dalmuir .	Beardmore T.	1917	1918	..	..		..	6 *4-in.* A.A., 4 *3-pr.*, 4 M., 10 L.	..	20¾	— / 2000	360
A.C.	Ark Royal	6,900	366	50 10	17 6	3000	Blyth	Blyth S. B. Co.	1914	1914	..	..		..	4 *12-pr.*, 4 M., 10 L.	..	11	— / 500	139
Cr.	Berwick	10,000	630	68 4	16 3	80,000	Govan	Fairfield .	1926	1928	..	..		..	8 *8-in.*, 4 *4-in.* A.A., 4 *3-pr.*, 4 *2-pr.*, 4 M., 8 L.	8	32	— / 3200	685
Cr.	Cornwall	10,000					Devonp'rt	Beardmore	1926	1928	..	..		..					
Cr.	Cumberland *See p. 387.*	10,000					Barrow	Vickers .	1926	1928	..	..		..					
Cr.	Birmingham *See p. 394.*	5120	459	49 11	15 10	25,000	Elswick .	Hawthorn. T.	1913	1914	353,437*	..		..	9 *6-in.*, 4 *3-pr.*, 1 *3-in.* A.A., 2 M., 8 L., 1 *2-pr.* Pom Pom.	2 (sub.)	25·5	1120 / 260	549
A.C.	Courageous *See p. 384.*	22,500	786½	89 10	22 3	90,000 Y.	Walker . (Armstr'g)	Parsons . P.T.(G.)	1916	1928	..	3		9-7	16 *4·7-in.*, 4 *3-pr.*, 4 *2-pr.*, 4 M., 10 L.	..	31	— / 3250	770
A.C.	Glorious (*a*) *See p. 384.*						Belfast .	Harland & Wolff T.(G.)		Bldg.	..	3		9-7					
P.L. Cr.	Carysfort	3895	446½	41 9	13 6	40,000	Pembroke	Hawthorn. B.C.T.	1914	1915	383,100	3 —		..	4 *6-in.*, 2 *3-in.* A.A. 4 *3-pr.*, 2 *2-pr.* Pom Poms; 1 M.; 8 L. [Conquest 3 *6-in.*]	4 Conquest none	29	— / 917	368
„ „	Cleopatra						Devonport	Cammell Laird P.T.	1914	1915	440,000								
„ „	Comus						Newcastle (Swan Hunter)	Wallsend Engn'g Co. P.T.	1914	1915									
„ „	Conquest *See p. 393.*						Chatham	Scotts' . P.T.	1914	1915									

(*a*) Conversion to aircraft-carrier proceeding at Devonport.

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GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Standard Displacement. (Washington Treaty.)	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Gun Position	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
												Deck.						
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
P. L. Cr.. .	Cairo .						Birken-head	Cammell Laird T.(G.)	1918	1919								
„ „ .	Calcutta .						Barrow .	Vickers . T.(G.)	1918	1919								
„ „ .	Capetown	4200	451¾	43 10	14 1	40,000	Birken-head	Cammell Laird T.(G.)	1919	1922	..	3 —	..	5 *6-in.*, 2 *3-in* A.A., 4 *3-pr.*; 2 *2-pr.* Pom Poms; 2 M.; 8 L.	8	29	— 950	415
„ „ .	Carlisle .						Govan .	Fairfield . T.(G.)	1918	1918								
„ „ .	Colombo . *See p. 392.*						Govan .	Fairfield . T.(G.)	1918	1919								
„ „ .	Caledon .						Birken-head	Cammell Laird T.(G.)	1916		547,300							
„ „ .	Calypso .	4180	450	43 1	14 1	40,000	Newcastle (Hawth'n)	Hawthorn Leslie	1917	1917	300,000	3 —	..	5 *6-in.*, 2 *3-in.* A.A., 4 *3-pr.*; 2 *2-pr.* Pom Poms; 2 M.; 8 L.	8	29	— 935	420
„ „ .	Caradoc . *See p. 392.*						Green'ck	Scotts' . T.(G.)	1916									
„ .	Calliope .						Chath'm	Parsons . P.T.(G.)	1914	1915	414,350							
„ .	Champion						Newcastle (Haw-thorn)	Hawthorn P.T.(G.)	1915	1915								
„ .	Cambrian .						Pem-broke	Cammell Laird T.	1916	1916								
„ „ .	Canterbury	3920	446½	41 9	13 6	40,000	Clyde-bank	J. Brown . T.	1915	1916	300,000†	3 —	..	4 *6-in.*, 2 *3-in.* A.A., 4 *3-pr.*, 2 *2-pr.*, Pom Poms; 1 M.; 8 L. [Champion 1 *3-in.* A.A.]	2 sub. (Champion 4 A.W. tubes additional.)	29	— 841	368
„ „ .	Castor .						Birken-head	Cammell Laird T.	1915	1915	358,300							
„ „ .	Constance. *See p. 393.*						Birken-head	Cammell Laird T.	1915	1916	374,270							

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P. L. Cr.	Cardiff	4290	450	43	9	14	1	40,000	Govan	Fairfield T.(G.)	1917	1917	..	8 / —	..	5 6-in., 2 3-in. A.A., 4 3-pr., 2 2-pr. Pom Poms; 2 M.; 8 L. [Cardiff / Ceres 2 3-pr.]	8	29	— / 950	430
„ „	Ceres								Clydebank	J. Brown T.(G.)	1917	1917								
„ „	Coventry								Newcastle (Swan Hunter)	Swan Hunter T.(G.)	1917	1918								
„ „	Curacoa								Pembroke	Harland & Wolff T.(G.)	1917	1918								
„ „	Curlew *See p. 392.*								Barrow	Vickers P.T.(G.)	1917	1917								
„ „	Centaur	4120	446½	42	3	13	6	40,000	Elswick	Vickers T.	1916	1916	300,000†	3 / —	..	5 6-in., 2 3-in. A.A., 2 3-pr., 2 2-pr. Pom Poms; 2 M.; 8 L. [Centaur 4 6-in.]	2 sub.	29	— / 820	437
„ „	Concord *See p. 392.*								Elswick	Vickers T.										
Cr.	Dartmouth *See p. 394.*	4860	453¼	48	8	15	6	23,467 Y. *t*	Barrow	Vickers P.T.	1911	1911	312,900	2¾ / —	..	8 6-in., 4 3-pr., 2 M., 1 3-in. A.A., 1 2-pr.; 8 L.	2 sub.	25·9 *t*	1290 / 260	460
P. L. Cr.	Despatch *See p. 391.*	4850	472¾	46	9	14	3	40,000	Govan	Fairfield T.(G.)	1919	1922	..	3 / —	Shields	6 6-in., 3 4-in. A.A., 2 M., 4 3-pr., 8 L., 2 2-pr. Pom Poms.	12	29	— / 1050	460
„ „	Danae								Elswick	Armstrong T.(G.)	1918	1918								
„ „	Dauntless								Jarrow	Palmer T.(G.)	1918	1918								
„ „	Dragon *See p. 391.*								Green'ck	Scotts' T.(G.)	1917	1918								
P. L. Cr.	Delhi	4850	472¾	46	9	14	3	40,000	Elswick	Armstrong T.(G.)	1918	1919	..	3 / —	Shields	6 6-in., 3 4-in. A.A. 4 3-pr., 2 2-pr. Pom Poms; 2 M.; 8 L.	12	29	— / 1050	460
„ „	Durban *See p. 391.*								Green'ck	Scott T.(G.)	1919	1921								
Cr.	Devonshire	10,000	630	66	0	17	0	80,000	Devonp'rt	Vickers P.T.	1927	Bldg.	..	..	..	8 8-in., 4 4-in. A.A., 4 3-pr., 4 2-pr., 4 M., 8 L.	8	32½	— / 3200	685
Cr.	Dorsetshire	10,000	..	..		..		..	Portsmouth	Cammell Laird	..	Bldg.	..	..	..	..	..	..	..	..
A.C.	Eagle, *ex*-Almirante Cochrane.	22,600	667½	105	2	21	11	50,000	Walker	J. Brown T.	1918	1924	3,310,042	..	..	9 6-in., 5 4-in. A.A., 4 3-pr., 4 M., 10 L.	..	24	— / 3750	746

† Estimated cost as originally designed.

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GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Standard Displacement. (Washington Treaty.)	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						£	in. / —	in.			knots.	tons.	
A.C.	**Furious** *See p. 385.*	22,450	786½	90 1	21 6	90,000	Walker (Armstrong)	Wallsend Engn'g Co. T.(G.)	1916	1917	1,920,000†	3 / —	7	10 *5·5-in.*, 6 *4-in.* A.A., 4 *3-pr.*, 4 *2-pr.*, 4 M., 10 L.	..	31	— / 4025	694
Cr.	**Effingham**	9770	605	65 1	17 3	65,000	Portsmouth	Harland & Wolff. T.	1921	1925	2,138,999	3 / —	Shields	7 *7·5-in.*, 3 *4-in.* A.A., 4 *3-pr.*; 2 M.; 8 L.	5 (1 sub.)	30·5	— / 2150	713
Cr.	**Frobisher** *See p. 388.*	9860					Devonport	Wallsend Eng. Co. T.	1920	1924	2,035,915†			[Frobisher, 4 *4-in.* A.A.]	6 (2 sub.)	30·5		715
Cr.	**Enterprise**	7100	570	54 9	16 6	80,000	Clydebank	John Brown T.(G.)	1919	1926	1,690,658*	3–1½ / 1	..	7 *6-in.*, 3 *4-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms; 2 M.; 8 L.	12	33	— / 1700	577
Cr.	**Emerald** *See p. 388.*			54 7			Elswick	Armstrong T.(G.)	1920	1926	1,474,235*							
Cr.	**Exeter**	8,400	..	..	..	..	Devonp'rt	Parsons	1928	Bldg.	..	..	..	..	..	..	..	..
P. L. Cr.	**Hawkins** *See p. 388.*	9,800	605	65 1	17 3	60,000	Chatham	Parsons Co. T.(G.)	1917	1919	..	3 / —	Shields	7 *7·5-in.*, 4 *4-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms; 2 M., 8 L.	6 (2 sub.)	30	800 / 1420	747
A.C.	**Hermes** *See p. 386.*	10,850	599½	‡70 3	18 7	40,000	Elswick	Parsons Co. T.(G.)	1919	1924	..	..	..	6 *5·5-in.*, 3 *4-in.* A.A. 4 *3-pr.*, 2 *2-pr.* Pom Poms; 4 M., 10 L.	..	25	— / 2000	531
Cr.	**Kent** *See p. 387.*	10,000	630	68 4	16 8	80,000	Chatham	Hawthorn Leslie	1926	1928	..	..	..	8 *8-in.*, 4 *4-in.* A.A., 4 *3-pr.*, 4 *2-pr.*, 4 M., 8 L.	8	32	— / 3200	685
Cr.	**London**	10,000	630	66 0	17 0	80,000	Portsmouth	Fairfield P.T.	1927	Bldg.	..	..	..		8	32¼	— / 3200	685
Cr.	**Lowestoft** *See p. 394.*	5120	458¾	49 10	15 10	25,000	Chatham.	Fairfield T.	1913	1914	375,162	..	..	9 *6-in.*, 4 *3-pr.*, 1 *3-in.* A.A., 2 M., 8 L., 1 *2-pr.* Pom Pom.	2 (sub.)	25·5	1075 / 235	540

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Cr.	Norfolk	10,000	..	..	..	..	..	Fairfield	Fairfield	..	Bldg.	..	..	..	..	..	..	..	..
A. C.	**Pegasus** (late Stockholm)	3150	333	45	1	14	6	9,500	Clydeb'nk	J. Brown B.C.T.(G.)	1917	1917	..	..	..	4 *12-pr.* (2 A.A.), 4 M., 10 L.	Nil.	20·25	— / 360	182
Cr.	**Shropshire**	10,000	630	66	0	17	0	80,000	Dalmuir	Beardmore	1928	Bldg.	..	..	..	8 *8-in.*, 4 *4-in.* A.A., 4 *3-pr.*, 4 *2-pr.*, 4 M., 8 L.	8	32¼	— / 3200	685
Cr.	**Sussex**	10,000	630	66	0	17	0	80,000	Hawthorn Leslie	Hawthorn Leslie	1928	Bldg.	..	..	..					
Cr.	**Suffolk** *See p. 387.*	10,000	630	68	4	16	3	80,000	Ports-mouth	Parsons	1926	1928	..	..	..		8	22	— / 3200	685
Cr.	**Vindictive** *See p. 388.*	9996	605	65	1	17	3	60,000	Belfast	Harland & Wolff. T. (G.)	1918	1918	..	8 / —	Shields	7 *7·5-in.*, 3 *4-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms; 2 M., 8 L.	6 (2 sub.)	30	800 / 1420	673
Cr.	**Yarmouth** *See p. 394.*	4860	453	48	8	15	6	22,000 Y.	Glasgow	J. Brown C. T.	1911	1912	353,238*	2¾	..	8 *6-in.*, 1 *3-in.* A.A., 4 *3-pr.*, 2 M., 8 L.	2 (sub.)	25·8 *t*	1290 / 260	460
Cr.	**York**	8,400	575	57	0	17	0	80,000 (G.)	Palmers'	Palmers'	1928	Bldg.	..	..	..	6 *8-in.*	..	32½‡	..	..

* Total estimated cost of ship, including guns. † Estimated cost excluding armament and ordnance stores. ‡ Extreme breadth under water; 100 ft. over seaplane lifting rails.

Two 10,000-ton cruisers are authorised for commencement this year; one will be **built at Devonport and the other at Portsmouth.**

Patrol Boats.—P.C. 74, Dart (1918), 610 tons, 20 knots, 1 4-in., 2 12-pr.; P.59 (1917), P.40 (1916), Spey (1917), 560 tons, 20 knots, 1 4-in., 1 2-pr.

Training Ships.—Erebus, Terror, Marshal Soult.

Fishery Protection Gunboats (ex-trawlers).—Colne, Doon, Dee, Garry, Kennet, **Liffey.**

Destroyer Depôt Ships.—Greenwich, Sandhurst.

Submarine Depôt Ships.—Lucia, Ambrose, Vulcan, Titania, Alecto, Adamant, **Dolphin, Cyclops. Medway is building at Messrs. Vickers.** One more is authorised for commencement this year.

Repair Ship.—Assistance. Resource is building at Messrs. Vickers.

Minelayers.—Medea, Medusa, Melpomene, Minerva, Veron, Kate Lewis.

Surveying Vessels.—Beaufort, Fitzroy, Flinders, Kellett, Herald, Ormonde, **Iroquois, Endeavour.**

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Defence Forces of the Dominions.

ROYAL AUSTRALIAN NAVY.

Class.	NAME.	Standard Displacement. (Washington Treaty).	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal. / Oil	Complement.
		tons.	ft.	ft. in.	ft. in.						£	in.		in.			knots	tons.	
Cr.	Australia	10,000	630	68 4	16 3	80,000	Brown Clyde-bank	Brown	1927	1928	..	..		..	8 *8-in.*, 4 *4-in.* A.A., 4 *3-pr.*, 4 *2-pr.* 4 M., 8 L.	8	32	— / 3400	..
„	Canberra																		
	See p. 387.																		
L. Cr.	Adelaide	5100	462½	50 1	15 10	25,000	Sydney	Sydney	1918	1922	..	..		..	9 *6-in.*, 4 *3-pr.*, 2 M., 1 *3-in.* A.A., 8 L.	2 (sub.)	25	951 / 558	450
„	Melbourne *						Birken-head	Cammell Laird. T.	1912	1913								1115 / 285	510
„	Sydney †	5120	457	49 10	15 9	25,000	Glasgow	London & Glasgow Co. T.	1912	1913	..	3		..	8 *6-in.*, 4 *3-pr.*, 2 M., 1 *3-in.* A.A., 8 L.	2 (sub.)	25·5	1210 / 260	392
„	Brisbane †.						Sydney	Vickers T.	1915	1916								1196 / 260	490
Seaplane Carrier	Albatross	5000	—	—	—	—	Cockatoo Island	—	1928	—	—	—		—	—	—	—	—	—
Flot. Ldr.	Anzac	1310	327½	31 10	11 1	36,000	Dumbar-ton	Denny T.	1917	1917	—	—		—	4 *4-in.* Q.F., 2 *2-pr.* A.A. 1 M., 4 L.	4	34	515 Oil	122

* These will shortly be placed on the sale list.

† In reserve.

DESTROYERS.—"*River*" *Class*:—Huon, Parramatta, Swan, Torrens, Warrego, Yarra. Completed, 1910–16; Displacement, 565 tons; 10,900–11,300 H.P.; speed, 26·5–27 knots; armament, one 4-in, three 12-pdrs., three torpedo tubes.

"*S*" *Class*:—Stalwart, Success, Swordsman, Tasmania, Tattoo. Completed, 1919; Displacement, 905 tons; 27,000 H.P.; speed, 36 knots; armament, three 4-in., one 2-pdr., 2 double torpedo tubes.

SUBMARINES.—Oxley and Otway, built by Messrs. Vickers, completed 1927, deplacement $\frac{1400}{1885}$ tons.

SLOOPS.—"*Flower*" *Class*:—Marguerite, Geranium (1916), 1,175 tons; speed, 16·5 knots; armament, 1 *4*-in., 2 *3*-pr.; Mallow (1915), 1,165 tons, 1 *12*-pr., 1 *3*-pr. A.A.

Surveying vessel Moresby (late Silvio) 1650 tons, length 267½ ft., 2,500 H.P., 17 knots, one 3-pr.

The Royal Australian Navy also includes the Cerberus, gunboat; Platypus, destroyer depôt and fleet repair ship.

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NEW ZEALAND NAVY.

LIGHT CRUISERS—"*D*" *Class*:—Dunedin [p. 391]; completed, 1919 (Elswick). Diomede [p. 391]; completed 1922 (Vickers). Displacement, 4,850 tons; 40,000 H.P.; speed, 29 knots; armament, 6 6-in., 3 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 2 M., 4 triple torpedo tubes; max. fuel, 1,050 tons oil; complement, 460.

EX-LIGHT CRUISER.—"*Pearl*" *Class*:—Philomel. (Training and Depôt-ship, Auckland.) Completed, 1892 (Devonport and Earle). Displacement, 2,575 tons; 7,500 H.P.; speed, 19 knots: armament, 1 6-in., 1 4-in., 2 12-pr.; coal, 300 tons; original complement, 217.

ROYAL CANADIAN NAVY.

DESTROYERS.—Champlain and Vancouver. Completed, 1919 (Thornycroft). Displacement, 905 tons; 29,000 H.P.; speed, 36 knots; armament, 3 4-in., 1 2-pr., 4 21-in. tubes; oil, 305 tons (radius of action, 2,000 at 15 knots).

MINESWEEPERS.—Festubert and Ypres, stationed at Halifax; and Thiepval, stationed at Esquimalt.

The Stadacona is in service as depôt-ship at Halifax and the motor-vessel Naden as depôt-ship at Esquimalt.

SOUTH AFRICA.

SURVEYING SHIP.—"*Beaufort*" *Class*:—Protea (ex-Crozier). Twin-screw mine-sweeper, converted 1919. Displacement, 710 tons; 2,200 H.P.; speed, 16 knots; coal capacity, 185 tons; armament, one 3-pr. Transferred to South Africa, September, 1921.

TRAWLERS.—*Admiralty Type*:—Immortelle and Sonneblom (late Eden and Foyle). Armament, one 12-pr. Transferred to South Africa, September, 1921, for mine-sweeping instructional duties.

DEPOT SHIP—Afrikander.

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ARGENTINE REPUBLIC.

Class.	NAME.	Displacement.	Length. (Extreme).	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Garibaldi * . .	6840	328	59¾	24	13,384	Sestri Ponente	1895	1896	752,000	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 10 *6-in.*, 6 *4·7-in.*, 2 *3-in.*, 4 *6-pr.*	..	19·9 *t*	1137 —	414
a.c.	General Belgrano†	6840	328	59¾	24	13,000	Leghorn .	1897	1899	696,700	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 14 *6-in.*, 4 *3-in.*, 4 *6-pr.*	..	20·1 *t*	1150 —	515
a.c.	General San Martin †	6773	328	59¾	24	13,000	Leghorn .	1896	1898	688,200	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	4 *8-in.*, 10 *6-in.*, 6 *4·7-in.*	..	19·8	1100 —	431
b.	Moreno . . / Rivadavia . *See p. 895.*	27940	585	95½	28	45,000	Camden, N.J. (N.Y.S.B.Co.) Quincy, Mass.	1911	1915 1914	2,200,000	12–10 K.S.	3–2	9–6 K.S.	9 K.S.	12–9 K.S.	6 K.S.	12 *12-in.*, 12 *6-in.*, 4 *3-in.* A.A., 4 *3-pr.*; 6 M., 4 L.	4 (sub.)	22·5	— 4200	1046
a.c.	Pueyrredon † . .	6840	328	59¾	24	13,000 B.	Sestri Ponente	1898	1901	782,000	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 10 *6-in.*, 6 *4·7-in.*, 2 *3-in.*, 4 *6-pr.*	..	20·1 *t*	1000 —	430

Moreno and Rivadavia were converted to oil burning and fitted with geared turbines in 1925.

The old coast-defence ironclads Libertad and Independencia, 2300 tons, completed at Birkenhead in 1892–93, carry two 9·4-in., four 4·7-in., and six 3-pr. guns. The Libertad is unserviceable at present, but is being refitted.

Two cruisers, Almirante Brown, Vinte Cinco de Maio, have been ordered from the Orlando Shipbuilding Co., Leghorn. One is builing at Leghorn and the other at the Odero Yard, Genoa, under licence from the Orlando firm. Displacement, 6,495 tons, length, 545 ft. 9 ins., beam, 58 ft., mean draught, 15 ft. 3 ins., 85,000 H.P., 32 knots, to carry six 7·5-in., twelve 4-in. A.A., and six T.T. Complement 600. Oil Fuel 2,000 tons, estimated cost £1,250,000. One more cruiser is projected.

Cruiser Buenos Aires (Elswick, 1895), 4780 tons, four 6-in., six 4·7-in., twelve 3-prs., 23·2 knots on trial. River gunboats Paraná and Rosario (Elswick, 1909), 1055 tons, two 6-in. howitzers, six 12-pr., 8 M., 2 L., 15 knots. For destroyers, see Flotilla Tables.

The training-ship (cruiser) Presidente Sarmiento, 2750 tons, 15 knots; two 4·7-in., two 4-in., four 6-pr., two 3-pr., also the old cruiser Nueve de Julio (aviation training ship), 3570 tons, Elswick 1902, of no military value. There are 13 transports and many auxiliaries.

Two sloops, San Juan and San Louis, built in England at Hawthorn & Leslie's, Newcastle, 790 tons, 12 knots, for survey purposes. Completed 1928, carry one 3-in.

Two tugs, Mataco, Toba completed 1928, at Messrs. Hawthorn & Leslie's, Newcastle. * Training ship. † Being converted to oil burning.

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BRAZIL.

Class.	NAME.	Displacement.	Length. (Extreme).	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal / Oil.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkheads.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s., t.	**Marshal Floriano**	3162	267½ p.p.	48	13½	3400 D'A.	La Seyne	1899	1901	..	13⅜–4 H.S.	1½	..	..	8 H.S.	3 H.S.	2 *9·4-in.*, 4 *4·7-in.*, 2 M., 4 *6-pr.*, 2 *1-pr.*	2 (sub.)	15·0	236 / —	200
b.	**Minas Geraes** . *See p. 396.*	19,281	543	83	25	27,212 *t* B.&W.	Elswick .	1908	1909	1,821,400	9–6–4 K.S.	2	9–6–4 K.S.	9	12·8 K.S.	9 K.S.	12 *12-in.*, 22 *4·7-in.*, 8 *3-pr.*, 2 *3-in.* A.A.; 4 M.	..	21·5 *t*	2360 / 350	850
b.	**São Paulo** . *See p. 396.*	19,281	543	83	25	28,645 *t* B.&W.	Barrow .	1909	1910	1,821,400	9–6–4 K.S.	2	9–6–4 K.S.	9 K.S.	12–8 K.S.	9 K.S.	12 *12-in.*, 22 *4·7-in.*, 8 *3-pr.*, 2 *3-in.* A.A.; 4 M.	..	21·5 *t*	2360 / 350	850

LIGHT CRUISERS:—Bahia and Rio Grande do Sul, completed at Elswick, 1910, reconstructed at Rio de Janeiro, 1926, 3100 tons, ten 4·7-in., six 1·8-in. guns, 2 twin torpedo tubes, 20,000 H.P., 27 knots; Barroso (Elswick, 1897), 3600 tons, six 6-in., four 4·7-in., four 6-pr., 8 M., 2 L. guns, 20 knots. Three 11-knot river gunboats, Missões, Teffé and Amapa.

MINELAYERS:—Maria do Couto, Carneiro da Cunha, Heitor Perdigao and Muniz Freire.

Also river monitors Maranhao and Pernambuco, built at Rio de Janeiro. The Maranhao is being converted into a gunboat scout at Rio de Janeiro, to be called Espirito Santo.

SUBMARINE TENDER:—Ceará (Spezia, 1916), 4000 tons, 4100 H.P., 14 knots, four 4-in. guns and two smaller.

CHILE.—Armoured Ships.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Almirante Latorre** (*ex* Canada) *See p. 397.*	28,000	661 p.p.	92 6	29 0	37,000 P. tur. Y 2	Elswick	1913	1915	..	9–4 A.I.	4–2½	4½	..	10	6	10 *14-in.*, 14 *6-in.*, 2 *3-in.*, A.A., 4 *3-pr.*	4 (sub.)	23	3300 / 520	1000
a.c.	**O'Higgins**	8,500	412 p.p.	62 9	22 0	16,000 B.	Elswick	1897	1898	..	7–5	2	..	..	7½–6	6	4 *8-in.*, 10 *6-in.*, 12 *3-in.*, 4 M.	2 (sub.)	21·5 *t*	1200 / —	500
b.	**Capitan Prat**	6,900	328 p.p.	60 9	22 9	12,000	La Seyne	1890	1893	391,000	12	3	4	..	10½	2	4 *9·4-in.* (Canet), 8 *4·7-in.* (Canet), 8 *6-pr.*, 11 M.	2	18·3 *t*	775 / —	500
a.c.	**Esmeralda**	7,020	436 p.p.	53 2	20 3	18,000	Elswick	1896	1897	..	6 H.S.	2	..	6 H.S.	4½ Shields	..	2 *8-in.*, 12 *6-in.*, 12 *3-in.*, 2 L.	2 (sub.)	22·8 *t*	1350 / —	500

Capitan Prat reconstructed in 1909.

Cruising Ships, &c.

Class	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						in.	in.			knots.	tons.	
cr.	**Blanco Encalada**	4400	370 p.p.	46 6	19 6	14,500	Elswick	1893	1894	..	4–1⅜	..	2 *8-in.*, 8 *6-in.*, 4 *3-in.*	2	22·78 *t*	850 / —	385
„	**Chacabuco**	4500	360 p.p.	46 6	17 0	15,500	Elswick	1901	1903	..	4½–1⅜	..	2 *6-in.*, 10 *4·7-in.*, 4 *3-in.*	2 (sub.)	24·0	1000 / —	400
„	**Ministro Zenteno**	3420	330½ p.p.	43 9	16 9	6500	Elswick	1896	1898	..	..	..	8 *6-in*, 4 *3-in.*, 8 M.	2	20·0	840 / —	300

Transports: Maipo, 4,686 tons gross; Rancagua, 6,210 tons gross; Angamos, 3,597 tons gross. Coastguard vessels: Orompollo, Leucoton, Elicura, Colocolo, 500 tons; Aguila, 820 tons; Porvenir, 450 tons.

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DENMARK.—Armoured Ships.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Fuel.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Guns.	Torpedo Tubes.		Coal. / Oil.	
		tons.	ft. ins.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.,t.	**Herluf Trolle** .	3595	283 9	49 6	16 6	4400 *t*	Copenhagen	1899	1901	..	7–4 H.S.	3	..	..	7	6	2 *9·4-in.*, 4 *5·9-in.*, 6 *8-in.*, 2 *6-pr.* A.A., 2 M.	3 (sub.)	16·0	250 —	256
c.d.s.,t.	**Niels Juel** .	4100	295 4	53 6	15 9	5500	Copenhagen	1918	1923	..	8–4 K.S.	2	..	7	..	H.S. 2	10 *5·9-in.*, 2 *6-pr.*, 2 *3-in.* A.A.	2 (sub.)	17·0	240 250	309
c.d.s.,t.	**Olfert Fischer** .	3650	283 9	50 6	16 9	4600 *t*	Copenhagen	1903	1905	..	7–4 K.S.	3	..	..	7	K.S. 6	2 *9·4-in.*, 4 *5·9-in.*, 6 *3-in.*, 2 *6-pr.* A.A., 2 *1-pr.*, 2 M.	3 (sub.)	16·0	250 —	256
c.d.s.,t.	**Peder Skram** .	3735	286 7	51 6	16 3	5400	Copenhagen	1908	1909	..	8–4 K.S.	2	..	..	7	K.S. 6	2 *9·4-in.*, 4 *5·9-in.*, 8 *3-in.*, 2 *1-pr.*, 2 *3-in.* A.A., 2 M.	4 (sub.)	16·0	250 —	262
c.d.s.,t.	**Skjold** . .	2200	239 5	38 0	13 6	2400 *t*	Copenhagen	1896	1899	..	10–3 H.S.	2	..	7	8	K.S. 5½	1 *9·4-in.*, 3 *4·7-in.* (K.), 4 *6-pr.*, 1 M.	—	13·0	109 —	137

Cruising Ships, &c.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft. ins.	ft.	ft.					£	in.	in.				tons.	
3rd cl. *cr.*	**Heimdal** . .	1289	237 1	34	11¾	3100 *t*	Copenhagen .	1894	1896	..	1½	..	2 *4·7-in.*, 4 *20-pr.*, 2 *6-pr.*, 2 *6-pr.* A.A., 2 M.	2	17·0	150	143

Heimdal, now in reserve. Mine-layers Lossen, Minekran IV–VI, Mining boats 1–10. Fylla (ex-British sloop Asphodel), and 5 other fishery inspection vessels. Groensund, submarine repair ship, Hekla, submarine depôt ship. Submarine depôt and repair ship Henrik Gerner completed 1928, displacement 490 tons, 900 H.P., 13 knots, carries two 3-in. guns.

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FRANCE.—Armoured Ships.

Class.	NAME. DATE FOR SCRAPPING.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Bretagne** . . 1934 *See p. 398.*	23,128*	544 6	88 6	29 0	29,000 N. tur.	Brest .	1913	1915	2,589,439	11–7 K.S.	2½–1½	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 8 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2700 / 300	1167
b.	**Condorcet**. . *See p. 400.*	18,592*	480 11	84 7	27 0	22,500 N. tur.	St. Nazaire	1909	1911	2,165,200	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 4 *3-pr.* A.A., 2 *1-pr.*, 2 L.	2 (sub.)	19·25	2100 / —	890
b.	**Courbet** . . 1930 *See p. 399.*	23,128*	544 6	88 6	29 0	28,000 N. tur.	Lorient .	1911	1913	2,508,388	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 3 *3-pr.*, 4 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2450 / 250	1140
b.	**Diderot** . . *See p. 400.*	18,592*	480 11	84 7	27 0	22,500 N. tur.	St. Nazaire	1909	1911	2,167,000	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 4 *3-pr.* A.A., 2 *1-pr.*, 2 L.	2 (sub.)	19·25	2100 / —	890
a.c.	**Edgar Quinet** . *See p. 402.*	13,828	521 4	70 7	27 6	39,803 *t* B.	Brest .	1907	1911	1,307,536	6½–3½ K.S.	2½–1¼	5–2 K.S	4¾ K.S.	8 K.S.	4¾ K.S.	14 *7·6-in.*, 2 *3-in.* A.A., 10 *9-pr.*, 2 *3-pr.*, 2 M.	2 (sub.)	23·0 *t*	1900 / —	874
a.c.	**Ernest Renan** . *See p. 401.*	13,500	521 7	70 0	27 6	37,500 Nic., *t*	St. Nazaire .	1906	1909	1,410,000	6¾–4 H.S.	2	5–3 H.S.	4¾	6 H.S.	5 H.S.	4 *7·6-in.*, 12 *6·5-in.*, 6 *3-in.* A.A., 12 *9-pr.*, 2 *1-pr.*	2 (sub.)	21·4 *t*	1870 / —	874
b.	**Jean Bart** . 1930 *See p. 399.*	23,128*	544 6	88 6	29 0	28,000 B. tur.	Brest .	1911	1913	2,528,888	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*, 4 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2450 / 250	1140
a.c.	**Jules Michelet**. *See p. 401.*	12,400	489 0	70 3	27 0	29,000 Guyot	Lorient .	1905	1908	1,204,107	6–4 K.S.	2	5–3 K.S.	6 H.S.	8 K.S.	5 K.S.	4 *7·6-in.*, 12 *6·5-in.*, 10 *3-pr.*, 2 M.	2 (sub.)	22·0	1870 / —	724

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b.	**Lorraine** . . 1936 *See p.* 398.	23,128*	544	6	88	6	29	0	29,000 tur. S. & cyl.	St. Nazaire	1913	1916	2,642,439	11–7 K.S.	2⅜–1⅜	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, *21-pr.*, 2 L.	4 (sub.)	20·0	2700 — 300	1167
b.	**Paris** . . . 1934 *See p.* 399.	23,128*	544	6	88	6	29	0	28,000 N. tur.	La Seyne	1912	1914	2,603,920	11–7 K.S.	2⅜–1⅜	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*, 4 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2450 — 250	1140
b.	**Provence** . 1935 *See p.* 398.	23,128*	544	6	88	6	29	0	29,000 tur.	Lorient	1913	1915	2,589,000	11–7 K.S.	2⅜–1⅜	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *3-in.* A.A., 4 *3pr.*, 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2700 — 300	1167
b.	**Voltaire** . . *See p.* 400.	18,592*	480	11	84	7	27	0	22,500 B. tur.	La Seyne	1909	1911	2,169,200	10–8 K.S.	2⅜	8⅜	..	12 K.S.	8⅜ K.S.	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 4 *3-pr.* A.A., 2 *1-pr.*, 2 L.	2 (sub.)	19·25	2100 — —	890
a.c.	**Waldeck-Rousseau** *See p.* 402.	13,828	521		70	7	27	6	35,286 Nic. *t.*	Lorient	1908	1911	1,301,380	6½–3½	2½	5	4⅜	6	5½	14 *7·6-in.*, 2 *3-in.* A.A., 10 *9-pr.*, 2 *3-pr.*, 2 M.	2 (sub.)	23·0 *t*	1900 — —	874

* Standard Displacement (Washington Treaty).

In the case of the battleships Condorcet, Diderot, and Voltaire, the date of scrapping has not been indicated.

The armoured cruisers Condé, Gueydon, and Jeanne d'Arc (1902–4) are retained temporarily as Training Ships.

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FRANCE.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Fuel.	Complement.
											Belt.	Gun Position.	Guns.	Torpedo Tubes.		Coal / Oil	
		tons.	ft. ins.	ft. ins.	ft. ins.					£	in.	in.			knots.	tons.	
training cruiser	1 in No.	6,500	525 0	..	..	50,000	Penhoet Yard, St. Nazaire	Bldg.	..	..	..	..	8 *6·1-in.*, 4 *2·9-in.* A.A., 2 *1·6-in.*, 2 M., 2 seaplanes	2 triple	25	..	..
cr.	C 2	10,000	..	..	..	..	Brest	..	..	..	..	..	..	..	..	..	..
cr.	Colbert	10,000*	636 6	65 7	..	120,000	Brest	1928	..	..	..	..	8 *8-in.*, 8 *3·5-in.* A.A., 8 *1-pr.* A.A., 3 seaplanes	2 triple	33	..	605
A.C.	Bearn †	21,160*	597 1	89 0	29 10	35,000	Chantiers de la Mediterranée, La Seyne	1920	1927	..	3¼	..	8 *6·1-in.*, 6 *3-in.* A.A., 8 *3-pr.* A.A., 12 M. A.A., 17 planes	4	21·6	— / 2070	875
A.T.	Commandant Teste	9840*	525 0	71 6	23 6	21,000	Chantiers de la Gironde, Bordeaux	Bldg.	..	..	..	..	6 *5·4-in.*, 6 3-*in.* A.A., 8 *3-pr.* A.A., 12 M., 20 planes	..	20·5	..	..
cr.	Suffren	10,000*	636 6	63 2	19 3	120,000	Brest	1927	1928	..	..	..	8 *8-in.*, 8 *3-in.* A.A., 8 *1·5-in.*, 3 seaplanes	2 triple	33	..	605
„	Tourville	9938*	626 8	62 4	19 6	130,000	Lorient	1926	1928	..	..	..	8 *8-in.*, 8 *3-in.* A.A., 8 *1·5-in.*; 2 seaplanes	2 triple	34	— / 2000	590
„	Duquesne						Brest	1925									
	See p. 403.																
„	Duguay-Trouin	7873*	594 10	56 6	17 0	100,000	Brest	1923	1926	..	..	..	8 *6·1-in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 M., 1 L., 2 seaplanes	4 triple	34	— / 1480	574
	See p. 404.																
„	La Motte Picquet	7873*	594 10	56 6	17 0	100,000	Lorient	1924	1926	..	..	..	8 *6·1 in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 M., 1 L., 2 seaplanes	4 triple	34	— / 1480	574
	See p. 404.																
„	Metz (*ex*-Königsberg)	6100	496 11	47 0	16 6	36,400	Bremen (Weser)	1915	1916	..	2½	1	8 *5·9-in.*, 2 *3-in.* A.A., 4 M.	2 sub. 2 a.w.	27·5	1270 / 500	433
	See p. 405.																
„	Mulhouse (*ex*-Stralsund)	5120	455 0	44 0	16 9	24,200 *t* (tur.)	Bremen (Weser)	1912	1913	416,340	4–2½	2	7 *5·9-in.*, 2 *3-in.* A.A., 2 M.	2	28·27 *t*	1200 / 130	454
	See p. 406.																

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,,	Primauguet *See p. 404.*	7873*	594	10	56	6	17	0	100,000	Brest	1924	1926	..	..	..	2 6·1-*in.*, 4 3-*in.* A.A., 2 3-*pr.*, 2 M., 1 L., 2 sea-planes	4 triple	34	—	574
,,	Strasbourg (*ex*-Regensburg) *See p. 405.*	5511	468	1	45	0	17	0	30,000 (P. tur.)	Bremen (Weser)	1914	1914	417,810	4–2½	2	6 5·9-*in.*, 1 3-*in.* A.A., 4 M.	4	27·0	1480 / 1200	
,,	Thionville (*ex*-Novara) *See p. 406.*	3500	428	7	42	0	15	6	25,000 (tur.)	Fiume	1913	1914	..	2½	..	9 3·9-*in.*, 1 3-*in.* A.A., 1 M.	2 twin 1 triple	27·0	380 / 800 / —	438 / 363

* Standard displacement (Washington Treaty).

† Originally designed as battleship.

One 10,000-ton cruiser is projected for commencement in 1929.

River Gunboat.—Francis Garnier, building, 750 tons, 15 knots, mounting two 4-in., one 3-in. A.A., two 2-pr., 4 M.

Minesweepers.—Vaillante, Conquérante completed 1918, 424 tons, 17 knots, mounting two 3·9-in. guns; Luronne, completed 1917, 295 tons, 13·8 knots, mounting two 3·9-in. guns; Impétueuse, Batailleuse, Audacieuse, completed 1917, 348 tons, 15 knots, mounting two 3·9-in. guns; Éveillé, Engageante, completed 1917, 360 tons, 17 knots, mounting two 3·9-in. guns; Agile, Inconstant, Ardent, completed 1916, 354 tons, 17 knots, mounting two 3·9-in. guns; Gracieuse, Capricieuse, Dédaigneuse, Malicieuse, Topageuse, Diligente, Surveillante, completed 1916, 348 tons, 15 knots, mounting two 3·9-in. guns; Granit, Mica, Porphyre, Meulière, Quartz, completed 1918, 394 tons, 12·5 knots, mounting one 9-pr. gun.

Minelayer.—Pluton, building, 5,215 tons, 30 knots, mounting four 5·4-in., ten 1-pr. A.A., 12 M.

Submarine Parent Ship.—Jules Verne, building, 5,904 tons, 18 knots, mounting four 3·5-in. A.A., four 1·5-in. A.A.

Sloops.—Ville d'Ys, Régulus, completed 1817, 1,378 tons, 17·5 knots, mounting one 3·9-in., three 3-in., 2 M.; Cassiopée, completed 1917, 1,378 tons, 17 knots, mounting two 5·5-in., two 3-in. A.A., 2 M.; A 1 and A 2 building, 2,460 tons, mounting three 5·1-in.

Despatch Vessels.—Du Couedic, Duperré, Dumont-D'Urville, Duchaffault, Dubourdieu, completed 1919–1920, 512 tons, 17·5 knots, mounting one 5·5-in., one 3·9-in.; Mondemont, Montmirail, Remiremont, Baccarat, Bethune, Vitry-le-Francois, Lievin, Calais, Lassigny, Les Esparges, Vauquois, Vimy, Craonne, Dunkerque, Epinal, Nancy, Coucy, La Faux, Amiens, Toul, Tahure, Arras, Bapaume, completed 1919–1924, 748 tons, 20 knots, mounting two 5·5-in., one 3-in. A.A., 2 M.; Escaut, Ailette, Ancre, Scarpe, Suippe, Meuse, Yser, Somme, Oise, Aisne, Marne, Quentin-Roosvelt, completed 1917–1919, 570–694 tons, 21 knots, mounting four 3·9-in., one–two 9-pr., one three 3-pr.

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GERMANY.—Armoured Ships.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal. / Oil.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft. ins.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Ersatz Preussen	10,000	—	—	—	—	Deutsche Werke, Kiel	—	Bldg.	—	—	—	—	—	—	—	6 *11-in.*	—	—	—	—
b.	Braunschweig	12,997	413 5	72 10	25 3	17,092 T.S. & C.*t*	Germania	1902	1904	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 12 *6·7-in.*, 8 *3·4-in.*, 23 M.	4 (a.w.)	18·43 *t*	1574 / 197	727
b.	Elsass	12,997	413 5	72 10	25 3	16,685 W.T.&C.*t*	Danzig (Schichau)	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *22-pr.*, 23 M.	5 (1 sub. 4 a.w.)	18·0 *t*	1574 / 197	727
b.	Hannover	13,040	413 1	72 10	25 3	17,768 T.S. *t.*	Wilhelmshaven	1905	1907	1,157,500	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 12 *3·4-in.*, 23 M.	4 (a.w.)	18·5 *t*	1771 / 197	727
b.	Hessen	12,997	413 5	72 10	25 3	16,000 T.S. & C.	Kiel (Germania)	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *22-pr.*, 23 M,	5 (1 sub. 4 a.w.)	18·0	1574 / 197	727
b.	Lothringen	12,997	413 1	72 10	25 3	16,950 W.T.&C.*t*	Schichau (Danzig)	1904	1906	1,157,500	9–4 K. S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *3·4-in.*	5 (1 sub. 4 a.w.)	18·54 *t*	1574 / 197	727
b.	Preussen	12,997	413 1	72 10	25 3	17,125 W.T.&C.*t*	Stettin	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *3·4-in.*	5 (1 sub. 4 a.w.)	18·0 *t*	1574 / 197	727
b.	Schlesien	13,040	413 1	72 10	25 3	19,465 *t*	Schichau	1906	1908	1,214,000	9½–4 K S.	3	8 K.S.	6 K.S.	11–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *5·9-in.*, 20 *2·2-pr.*, 6 *3·4-in.*, 2 *3-in.*, 23 M.	5 (1 sub. 4 a.w.)	18·5 19·0 *t*	1771 / 197	727
b.	Schleswig-Holstein					19,868 T.S.&C.*t*	Germania														

The old battleship Zahringen is being fitted out as a distantly controlled target vessel. The Lothringen, Preussen and Braunschweig are paid off; considered too old for further use.

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GERMANY.—Cruising Ships, etc.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Fuel.	Complement.
												Belt.	Gun Position.	Guns.	Torpedo Tubes.		Coal. / Oil.	
		tons.	ft. ins.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
l.c.	**E** . . .	6000	..	..	..	..	Wilhelmshaven	..	..	..	..	..	..	..	..	..	..	..
l.c.	**Koln** . .	6000	..	..	..	65,000	Wilhelmshaven	..	1928	Bldg.	..	..	..	9 5·9-*in.*	4 triple	32	..	500
l.c.	**Karlsruhe**	6000	570 10	49 10	17 8	65,000	Deutsche Werke, Kiel	..	1927	Bldg.	..	..	..	9 5·9-*in.*, 4 3·4-*in.* A.A.	4 triple	32	..	500
l.c.	**Königsberg** *See p. 407.*						Wilhelmshaven	..	1927	1928	..	..	..					
l.c.	**Emden** . . *See p. 408.*	6000	510 2	46 11	17 4	46,000	Wilhelmshaven	..	1925	1925	..	..	..	8 5·9-*in.*, 8 3·4-*in.*	2 twin	29	1100 / 700	483
l.c.	**Berlin** * .	3200	362 7	43 4	16 5	10,857 *t*	Danzig Dockyard	..	1903	1905	..	..	..	10 4·1-*in.*, 18 M.	2	22·6 *t*	846 / —	350
l.c.	**Hamburg** *					10,746 *t*	Vulcan, Stettin	..	1903	1904	..	..	..					
l.c.	**Arkona** . .	2656	342 6	40 4	16 5	8,290 *t*	Weser . .	..	1902	1903	..	..	..	10 4·1-*in.*, 18 M.	2	21 *t*	700 / —	330
l.c.	**Medusa** .	2608	342 6	38 9	16 5	8,000	Weser . .	..	1900	1901	..	..	..	10 4·1-*in.*, 18 M.	2	22	570 / —	330
l.c.	**Amazone** .						Germania .	..	1900	1901	..	..	..					
l.c.	**Thetis** .						Danzig Dockyard	..	1900	1901	..	..	..					
l.c.	**Nymphe** .						Germania .	..	1899	1900	..	..	..	10 4·1-*in.*, 4 M.				

* Training Ships.

Arkona has only 8 guns mounted.

Gunboats Drache, Hay.

Surveying vessels Meteor and Panther.

GREECE.—Armoured Ships.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Giorgios Averoff** * *See p. 409.*	9956	462	69	24¾	21,500 B. *t*	Leghorn (Orlando)	1910	1911	1,100,000	8–3½ K.S.	1¾	7	7	8–6½	7	4 *9·2-in.*, 8 *7·5-in.*, 16 *3-in.*, 4 *3-pr.*, 2 *3-in.* A.A., 2 M.	3 (sub.)	24·0 *t.*	1500 —	..
b.	**Kilkis** † (*ex* Mississippi)	13,000	382	77	24¾	13,765 B.&W. *t*	Phila-delphia	1905	1908	616,360	9–4 K.S.	3½–1 K.S.	7 K.S.	7 K.S.	10–7½ K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 8 *7-in.*, 8 *3-in.*, 2 *3-in.* A.A., 4 *6-pr.*, 4 *1-pr.*, 8 M., 2 L.	2 (sub.)	17·1 *t.*	1820 —	800
b.	**Lemnos** (*ex* Idaho) *See p. 409.*																				
b.c.	**Salamis** (*ex* Vasilefs Giorgios)	19,500	570¾	82	25¼	40,000	Hamburg	1914	Bldg.	..	..	..	..	..	..	..	8 *14-in.*, 12 *6-in.*, 12 *12-pr.*	2 (sub.)	24	..	..

* Retubed and refitted 1927.

† Retubed and refitted 1926.

The old coast defence vessels Hydra, Psara, and Spetsai are used in the training service. The Salamis is still in the same condition as when launched.

GREECE.—Cruising Ships.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Fuel.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.		Coal. Oil.	
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Helle ‡ (*ex* Fei-Hung)	2600	322	39	14	6500 tur.	Camden, N.J. .	1912	1914	240,000	¾	..	3 *4-in.*, 1 *3-in.* A.A., 110 mines	2	20	600 / 100	230

‡ Being repaired in France and fitted as a minelayer.

Old gunboat, Amvrakia, 470 tons. Training ship, Ares, 1811 tons, building at Chantiers de la Mediterranée, la Seyne. Repair ship, Ephestios, 4921 tons gross, 11½ knots.

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ITALY.—Armoured Ships.

Class.	NAME. DATE FOR SCRAPPING.*	Standard Displacement. (Washington Treaty.)	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b. 1st Cl.	**Andrea Doria** 1937	22,630	575 9	92 0	29	24,000 P. tur. Y.	Spezia . .	1913	1915	..	10–4 K.S.	1¾	6 K.S.	..	9½ K.S.	6 K.S.	13 *12-in.*, 16 *6-in.*, 13 *3-in.*, 6 *3-in.* A.A., 2 *2-pr.*, 6 M., 4 L.	2 (sub.)	21	1430 / 840	1074
b. 1st Cl.	**Caio Duilio** 1936 *See p.* 410.						Castellammare	1913	1915										21·3		
b. 1st Cl.	**Conte di Cavour** 1936 *See p.* 411.	22,030	575 9	92 0	29	24,000 Parsons B. & W.	Spezia . .	1911	1915	..	10–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5 K.S.	13 *12-in.*, 18 *4·7-in.*, 13 *3-in.*, 6 *3-in.* A.A., 2 *2-pr.*, 2 M., 4 L.	2 (sub.)	21·5	1430 / 840	1074
b. 1st Cl.	**Dante Alighieri** 1931 *See p.* 412.	19,250	549 6	87 5	29	26,000 Parsons Bl.	Castellammare	1910	1912	..	9½–4½ K.S.	1½	6 K.S.	..	10 K.S.	4	12 *12-in.*, 20 *4·7-in.*, 12 *3-in.*, 6 3-*in.* A.A., 2 *2-pr.*, 2 M., 4 L.	2 (sub.)	22·8	1300 / 690	900
b. 1st Cl.	**Giulio Cesare** 1935 *See p.* 411.	22,725	575 9	92 0	28	24,000 P. B.&W. P. Bl.	Genoa (Ansaldo)	1911	1914	..	10–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5 K.S.	13 *12-in.*, 18 *4·7-in.*, 13 *3-in.*, 6 *3-in.* A.A., 2 *2-pr.*, 2 M., 4 L.	2 (sub.)	21·5	1430 / 690	1074
a.c.	**Pisa** * . . . *See p.* 413.	10,430	460 11	68 11	24¾	20,000 B.	Leghorn (Orlando)	1907	1909	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	8–6 K.S.	6½ K.S.	4 *10-in.*, 8 *7·5-in.*, 14 *3-in.*, 6 *3-in.* A.A., 2 *3-pr.*, 4 M., 2 L.	3 (sub.)	23·4	1486 / 138	687
a.c.	**San Giorgio** .	10,000	462 2	69 0	24¾	18000 Bl. 20000 tur.	Castellammare	1908	1910	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	7 K.S.	4 *10-in.*, 8 *7·5-in.*, 10 *3-in.*, 6 *3-in.* A.A., 2 *3-pr.*, 6 M., 2 L.	3 (sub.)	23·2	1476 / 115	643
a.c.	**San Marco** . *See p.* 413.	10,915																	23 7	1378 / 66	

* Boys' training ship.

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ITALY.—Cruising Ships.

Class.	NAME.	Standard Displacement. (Washington Treaty.)	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Side. / Deck.	Armour. Gun Position.	Armaments. Guns.	Armaments. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft.					£	in.	in.			knots.	tons.	
l. cr.	Zara . .	10,000	..	..	..	..	Odero-Terni, Muggiano	Bldg.	..	..	..	..	.. ..	..	..	..	..
l. cr.	Fiume . . .	10,000	..	..	..	..	Stabilimento Tecnico Triestino, Trieste	Bldg.	..	...	..	..	.. ..	..	..	..	..
l. cr.	Alberto da Giussano . . Alberico di Barbiano . . Bartolomeo Colleoni . . Giov. della Bande Nere . .	5000	..	..	..	..	Three at Ansaldo One at Castellamare	..	..	..	..	..	8 *6-in.*, 8 *4-in.* A.A. . .	4	37	..	..
cr.	Trieste .	10,000	640 9	67 7	18¾	150,000	Leghorn (Orlando)	1926	1928	..	..	..	8 *8-in.*, 12 *4-in.*, 6 smaller, 1 catapult, 3 seaplanes	4 (twin)	36	— / 1380	800
cr.	Trento . . *See p. 414.*						Trieste . .	1927									
Ac.	Ancona . . . (*ex* German Graudenz) *See p. 417.*	5210	456 0	45 0	17	26,000	Kiel . . .	1913	1914	..	4–2½ / 1	..	7 *5·9-in.*, 2 *3-in.* A A., 3 M., 120 mines	4 (2sub.)	27·25	1279 / 400	364
„	Bari (*ex*-German Pillau) *See p. 415.*	4252	440 11	46 0	19	28,000 turb.	Danzig (Schichau) .	1914	1915	..	— / 1½–¾	1	8 *5·9-in.*, 3 *3-in.* A.A., 3 M.. 120 mines	2	27·5	984 / 250	372
„	Brindisi (*ex*-Austrian Helgoland) *See p. 416.*	3440	430 0	42 0	15	25,000 Tur.	Fiume . . .	1912	1914	..	2½ / ¾	..	9 *3·9-in.*, 1 3-*in.* A.A., 3 M., 1 L., 170 mines	4	27·0	750 / —	320

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l. c.	**Libia**	4395	367	0	47	6	16	11,500	Genoa (Ansaldo)	1912	1913	..	— / $1\frac{1}{2}$	..	8 *4·7-in.*, 3 *3-in.* A.A., 3 M.	2	22·9	640 / —	300
A.C.	**Miraglia**	4881	397	0	49	3	17	12,000	Spezia	1923	1925	..	..	..	4 *3 in.* A.A., 1 M., 4 catapults	..	21	..	..
l. cr.	**Quarto** *See p. 417.*	3388	431	9	42	2	$13\frac{1}{4}$	25,000 P.tur.Bl.	Venice	1911	1912	..	— / $1\frac{1}{2}$–$\frac{3}{4}$	..	6 *4·7-in.*, 6 *3-in.*, 2 *2-pr.* A.A., 3 M., 126 mines	2	28·6	49 / 482	240
l. cr.	**Taranto** (*ex*-German Strassburg) *See p. 415.*	4837	446	2	43	7	$15\frac{3}{4}$	25,650 *t* P. tur.	Wilhelmshaven	1911	1912	416,340	4–$2\frac{1}{2}$ / —	2	7 *5·9-in.*, 2 *3-in.* A.A., 3 M., 120 mines	2 (sub.)	27.5	1200	373
l. cr.	**Venezia** (*ex*-Austrian Saida) *See p. 416.*	3445	430	0	42	0	15	25,000 Tur.	Monfalcone	1912	1914	..	$2\frac{1}{2}$ / $\frac{3}{4}$	..	9 *3·9-in.*, 1 *3-in.* A.A., 3 M. Carries mines	4	27·0	750 / —	320

Mine-layers and mine-sweepers Fasana, Buccari, Durazzo, Pelagosa, completed 1926, 600 tons, 11 knots, 200 mines; Azio, Legnano, Lepanto, Dardanelli, Milazzo, Ostia, completed 1926, 700 tons, 15 knots. Marghera, Brondobo, 117 tons, 13 knots; Laurana, Rovigno, Albona, 130 tons, 11 knots. Minesweepers Ansonia, 470 tons, 11·3 knots; Cotrone, Viesti, 475 tons, 13·8 knots; 35 in No, 200 tons, 13 knots. Oil transports Marte, Dalmazia, Istria, Livenza, Urano, Prometeo, Cocito, Lete, Stige, Niobe, Cerrere, Giove, Tarvisio, Quarnero. Oil transport with under-water protection, Brennero. Gunboats and river gunboats, Toselli, Arimondi, Berenice, Boeo, Cirene, Gallipoli, G. Lante, Augusta, Otranto, Palmajola, P. Corsini, Rimini, S. Caboto, E. Carlotto. Escort gunboats, A. Bafile, T. Farinati, E. Giovannini, C. del Greco, A. Vitturi, 23 knots. Surveying vessel, Ammiraglio Magnaghi, 1800 tons, 14 knots. 104 armed motor boats (M.A.S.) built and 4 under construction.

Training ships Cristoforo Colombo built at Castellammare di Stabia.

Submarine Depôt Ships Volta and Pacinotti, **2,362 tons, 19 knots, completed 1924.**

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JAPAN.—Armoured Ships.

Class.	NAME. DATE FOR SCRAPPING.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.†
		tons.	ft. ins.	ft. ins.	ft. ins.						in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Fuso** . 1937 *See p.* 420.	30,600	673 0	94 0	28 6	40,000 tur.	Kure .	1914	1915	..	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 16 *6-in.*, 6 *3-in.* A.A., 4 M., 4 L., 2 seaplanes	6 (sub.)	22·5	4000 / 1300	1272
b.	**Hyuga** . 1940 *See p.* 419.	31,260	683 0	94 0	28 6	45,000 tur.	Nagasaki (Mitsubishi)	1917	1918								12 *14-in.*, 20 *5·5-in.*, 4 *3-in.* A.A., 2 M. H.A., 2 planes	6 (sub.)	23·0	4500 / 1300	1360
b.c.	**Haruna** . 1935	27,500	704 0	92 6	27 0	64,000 My. P. t.	Kobe . (Kawasaki)	1913	1915	..	8–3 K.S.	2¾	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 2 planes	8 (sub.)	27·5	4000 / 1000	1250
„	**Hiyei** . 1935 *See p.* 421.			92 0	27 6	My. C. t.	Yokosuka .	1912	1914												
b.	**Ise** . 1939 *See p.* 419.	31,260	683 0	94 0	28 6	45,000 P. tur.	Kobe . (Kawasaki)	1916	1917	..	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 20 *5·5-in.*, 4 *3-in.* A.A., 2 M. H.A., 2 seaplanes	6 (sub.)	23·0	4500 / 1300	1360
b.c.	**Kirishima** . 1936 *See p.* 421.	27,500	704 0	92 6	27 0	64,000 My. P. t.	Nagasaki . (Mitsubishi)	1913	1915	..	8–3 K.S.	2¾	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *3-in.*, A.A., 4 M., 4 L.	8 (sub.)	27·5	4000 / 1000	1250

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,,	**Kongo** . 1934 *See p* 421.	27,500	704	0·92	0·27	6	64,000 Y. P. *t.*	Barrow	1913	1913	2,500,000	8–3 K.S.	2¾	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 2 planes	8 (sub)	27·5	4000/1000	1309 (as flag-ship)
b.	**Mutsu** . 1942	33,800	700	0·95	0·30	9	46,000 G	Yokosuka	1920	1921	..	12 K.S.	3½	..	..	..	..	8 *16-in.*, 20 5 *5-in.*, 4 *18-pr.* A.A., 1 seaplane	8 (4 sub.)	23·0	1600/3400	1304 1367 (as fleet flag-ship)
b.	**Nagato** . 1941 *See p* 418							Kure .	1919	1920															
b.	**Yamashiro** . 1938 *See p.* 420.	30,600	673	0·94	0·28	6	40,000 tur.	Yokosuka	1915	1917	..	12 K.S.	3	8 K.S.	..	12 K.S	6 K.S.	12 *14-in.*, 16 *6-in.*, 6 *3-in.* A.A., 4 M., 4 L., 2 seaplanes	6 (sub.,	22·5	4000/1300	1272

COAST-DEFENCE SHIPS: Chitose, Asama, Yakumo, Azuma, Izumo, Iwate, Nisshin, Kasuga, Tsushima completed 1899–1904.

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JAPAN.—Cruising Ships, &c.

Class	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Side. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Chokai	10,000	..	..	..	..	Nagasaki	..	..	..	..	..	..	..	..	..	..
cr.	Maya						Kobe	..	..	..	..	..	..	..	..	.	..
A.C.	Akagi *	26,000	763 p.p.	92	0 21	2 131,200 (G.)	Kure	1925	1927	..	..	..	10 *8-in.*, 4 *4·7-in.*, 12 *4·7-in.* A.A., 66 planes	6	28·5	2100 / 3000	..
cr.	Atago	10,000	..	..	..	..	Kure	Bldg.	..	..	..	..	8 *8-in.*, 8 *4·7-in.* A.A.	..	..	..	..
„	Takao						Yokosuka										
A.C.	Wakamiya	5870	365 p.p.	48¼	19	1,591	England	..	1901	..	..	..	2 *3-in.*, 2 *3-pr.* A.A., 10 sea-planes.	..	11	500 / —	140
„	Notoro	15,400	445	58	26½	3,750	Kawasaki	1920	1927	..	..	..	2 *5·5-in.*, 2 *3-in.* A.A., 15 sea-planes	..	12	..	..
cr.	Ashigara	10,000	630	57	16½	130,000	Kobe	1928	Bldg.	..	..	..	..	..	33 5	— / 3000	692
„	Haguro						Nagasaki	1927									
„	Myoko						Yokosuka	1927		..	3 / —	..	10 *8-in.*, 4 *4·7-in.* A.A.	12			
„	Nachi						Kure										
cr.	Kinugasa *See p. 422.*	7100	595	51	14¾	100,006	Kawasaki, Kobe	1926	1927	..	..	..	6 *8-in.*, 4 *4·7-in.* A.A.	12	33	400 / 1400	604
„	Aoba						Nagasaki	1926	1927								
„	Furutaka						Uraga	1925	1926				6 *8-in.*, 4 *3-in.* A.A., 2 planes				
„	Kako						Kawasaki, Kobe	1925	1926								
	Chikuma	4950	475	46½	16¾	22,500 Cur. t. My.	Sasebo	1914	1912	..	2¼	..	8 *6-in.*, 2 *3-in.* A.A., 2 M.	3	26	900 / 300	410
	Hirado					22,500 P. tur. My.	Kobe										
„	Yahagi						Nagasaki										
A.C.	Hosho	9500	510	62	20¼	30,000 (G.)	Tsurumi (Asano)	1921	1922	..	..	..	4 *5·5-in.*, 2 *3-in.* A.A., 28 planes	..	25	— / 2700	550
l.cr.	Abukama	5570	350	46¾	15¾	90,000 (G.)	Uraga	1923	1925	..	2 / —	..	7 *5·5-in.*, 2 *3-in.* A.A., 2 M., 1 Pom-pom A.A.	8	33·0	300 / 1260	450
„	Isudzu						Uraga	1921	1923								
„	Nagara						Sasebo	1922	1922								
„	Natori						Nagasaki (Mitsubishi)	1922	1922								
	See p. 425.																

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l. cr.	Yura							Sasebo	1922	1923				7 5·5-*in.* 2 3-*in.* A.A., 2 M., 1 Pom-pom A.A.	8	33·0	300	450
,,	Kinu	See p. 425.	5570	530	46¾	15¾	90,000 (G,)	Kawasaki	1922	1922	..	2	..				1260	
A.C.	Kaga †		26,900	715	106 2	28 0	91,000	Kobe (Kawasaki)	1921	Bldg.	..	..	..	10 8-*in.*, 4 4·7-*in.*, 12 4·7-*in.* A.A., 66 aircraft	6	25·3	—	..
																	5300	
l. cr.	Jintsu							Kawasaki	1923	1925								
,,	Naka		5595	535	46¾	15¾	90,000	Yokohama	1925	1925	..	2	..	7 5·5-*in.*, 3 3-*in.* A.A., 2 M., 1 Pom-pom A.A.	8	33·0	300	450
,,	Sendai	See p. 423.						Nagasaki	1923	1924		—					1260	
,,	Kiso	See p. 425.						Nagasaki	1920	1921								
,,	Kitakami	See p. 425.						Sasebo	1920	1921								
,,	Kuma	See p. 425.	5500	535	46¾	15¾	90,000 (G.)	Sasebo	1919	1920	..	2	..	7 5·5-*in.*, 2 3-*in.* A.A., 2 M., 1 Pom-pom A.A., 80 mines	8	33·0	300	439
,,	O-I	See p. 425.						Kobe	1920	1921		—					1260	
,,	Tama	See p. 425.						Nagasaki (Mitsubishi)	1920	1921								
,,	Tatsuta		3500	468	40¾	13	51,000 (G.)	Sasebo	1918	1919			..	4 5·5-*in.*, 1 3-*in.* A.A., 2 M.	6	31	—	332
,,	Tenryu	See p. 425.						Yokosuka									900	
,,	Tone		4100	406	47⅛	16¾	15,000 My	Sasebo	1907	1910	..	2½	..	2 6-*in.*, 2 3-*in.* A.A., 2 12-*pr.*, 2 M.	3	23·0	892	401
																	124	
,,	Yubari	See p. 424.	3100	465	39½	11¾	55,000 (Estimated.)	Sasebo	1923	1923	..	..	..	6 5·5-*in.*, 2 3-*in.* A.A., 2 M.	4	33	—	328
																	820	

* Re-designed from battle cruiser. † Re-designed from battleship.

MINE-LAYERS.—Katsuriki, 1917, 2,000 tons, 13 knots, 3 4·7-in., 150 mines; Itsukushima, building at Uraga, 1970 tons, and one projected. Also Aso (old cruiser converted), 1903, 7,800 tons, 22 knots, 8 6-in., 1 3-in. A.A., 420 mines, and 17 smaller.

MINE-SWEEPERS.—Nos. 1, 2, 3 (1923), No. 4 (1925), and Nos. 5, 6 (building), 700 tons, 20 knots, 2 4·7-in., 1 3-in. A.A.

GUNBOATS.—Saga (1912), 785 tons, 15 knots, 1 4·7-in., 3 3-in.; Uji (1903), 620 tons. 13 knots, 4 3-in.

RIVER GUNBOATS.—Two projected. Katata, Hira, Hodzu, Seta (1923), 338 tons, 16 knots, 2 3-in. A.A.; Ataka (1922), 820 tons, 16 knots, 2 4-7-in., 2 3-in. A.A.; Toba (1911), 250 tons, 15 knots, 2 3-in.; Fushimi (1906), 180 tons, 14 knots, 2 6-pr.; Sumida (1906), 126 tons, 13 knots, 2 6-pr.

SUBMARINE DEPÔT SHIPS.—Chogei (1924), Jingei (1923), 8,500 tons; Komahashi (1914), 1,230 tons.

One aircraft carrier projected.

Class.	NAME	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns	Torpedo Tubes.	Speed.	Fuel. Coal. Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
a.g.b.	Brinio	540	171	28	9¼	1200	Amsterdam	1912	1914	..	2 K.S.	¾	..	..	..	..	4 *4·1-in.*, 2 M.	..	14	34 Oil	52
,,	Friso							1912	1914												
,,	Gruno							1913	1915												
c.d.s.	Hertog Hendrik *See p. 426.*	5000	317	50	19	6282 *t.*	Amsterdam	1902	1903	347,500	6 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 6 *5·9-in.*, 4 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	3 2 sub	16·5 *t*	710 —	347
,,	Jacob van Heemskerck *	4921	321½	50	19	6396 *t.*	Amsterdam	1906	1908	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	6 H.N.S.	2 *9·4-in.*, 6 *5·9-in.*, 6 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	2 (sub.)	16·5 *t*	520 —	351
l. cr.	Java	6930	509½	52½	18	65,000	Flushing	1921	1925	..	3	..	1	..	4	..	10 *5·9-in.*, 4 *3-in.* A.A., 8 M., 40 mines.	—	30	— 1070	490
,,	Sumatra						Amsterdam	1920	1926												
c.d.s.	Marten Tromp * *See p. 426.*	5216	330	50	18¾	6405 *t*	Amsterdam	1904	1906	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 8 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	2 (sub.)	16·7 *t*	710 —	349
c.d.s.	De Zeven Provincien *	6426	333	56	20½	8516 Y. *t*	Amsterdam	1909	1910	..	6–4 K.S	2	..	..	10 K.S.	4 K.S.	2 *11-in.*, 4 *5·9-in.*, 10 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	..	16·3 *t*	885 —	409

The Java and Sumatra are assigned to the Indian Military Marine. Light cruiser Gelderland (1900), 3,966 tons, now used as gunnery training ship. Five old gunboats: Zeehond, 699 tons, Hefring, 265 tons, Braga, Tyr and Freyr, 275 tons. Gunboats in the Indian Military Marine: Soemba, Flores, completed 1926 and 1927 respectively, of 1,676 tons, 15 knots, three 5·9 in., 1 3-in. A.A., 2 M.; Mataram (1897), 797 tons; Koetei (1899), 778 tons. Mine-layers. Douwe Aukes, Van Meerlant (1922), 749 tons, 13·5 knots, three 3-in. A.A., 2 M., 30 mines; Medusa and Hydra (1911), 670 tons, 11·5 knots, three 3-in., one 1-pr., 1 M., 65 mines; and eight old vessels. Mine-layers attached to Indian Military Marine: Krakatau (1924), 1,120 tons, 17 knots, two 3-in A A., 2 M., 150 mines; Pro Patria (1923), 605 tons, 11 knots, one 3-in. A.A., 2 M., 80 mines; four old vessels and four building. Four mine-sweepers: I.–IV., 270–295 tons. Surveying vessels: Eilerts de Haan, Hydrograaf (and Willebrord Snellius building); and in the Indian Military Marine, Van Doorn, Van Gogh, Tydeman. Submarine depôt ship in the Indian Military Marine, Pelikaan (1922), 2,600 tons, 12 knots, four 2·75 in., 4 M.

2 C.M.B.'s are building at Messrs. Thornycroft's.

* Of little fighting value.

NORWAY.—Armoured Ships.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Fuel.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position.		Guns.	Torpedo Tubes.			
															Heavy Guns.	Secondary.				Coal. / Oil.	
		tons.	ft.	ft.	ft.					£	in.	in.			in.	in.			knots.	tons.	
c.d.s.	Eidsvold . / Norge . *See p. 426.*	4166	310¼	50½	16½	5100 Y. *t*	Elswick	1900	1901	350,000	6 H.N.S.	2	..	..	6 H.N.S.	6 H.N.S.	2 *8·2-in.* 6 *5·9-in.*, 8 *3-in.*, 6 *3-pr.*	2 (sub.)	16·9 *t*	550 —	270
„	Harald Haarfagre .	3860	304	48½	16½	4720 *t*	Elswick	1896	1898	300,000	7 H.S.	2	..	..	8 H.S.	..	2 *8·2-in.*, 6 *4·7-in.*, 6 *3-in.*, 6 M.	3 2 sub.	17·2 *t*	550 —	249
„	Tordenskjold							1897	1899												

Cruising Ships.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.b. 2nd Cl.	Æger . . .	413	108½	29½	8	350	Horten .	1892	1893	..	1½	..	1 *8·2-in.*, 1 *2·7-in.*, 2 *1·9-in.* . . .	..	9·0	22	43
g.b. 1st Cl.	Frithjof . . (laid up)	1460	223¾	32¾	13¼	2800	Horten .	1896	1898	..	..	..	2 *4·7-in.*, 4 *3-in.*, 4 M.	1 (sub.)	15·0	160	154

Mine-layers Fröya (1918), 760 tons, 22 knots, 100 mines; Glommen and Laugen (1918), 350 tons, 10 knots, 50 mines; seven old gunboats refitted as mine-layers 230-280 tons.

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SOVIET UNION.—Armoured Ships.

	NAME.	Displacement.	Length. Extreme).	Beam.	Draught.	Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
b.	Pariskaia Kommuna	tons.	ft.	ft.	ft.							in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	October Revolution (*ex*-Gangut)	23,000	594	87	27½	42,000	Baltic Works	Baltic Works	1911	1915	..	9–5	3	..	..	12–10	6	12 *12-in.*, 16 *4·7 in.*, 2 *9-pr.* A.A., 1 *3-pr.*	4 (sub.)	23	2000 / 1000	—
b.	Marat																					
b.	Michael Frunze (*ex*-Poltava)																					
b.	General Alexieff *	22,600	551½	89¾	27	26,500	Nikolaev R.S.B.Co.	..	1914	1917	..	12–4	3–1½	9–8	..	12–8	5	12 *12-in.*, 18 *5-in.*, 4 *2·5-in.* A.A., 4 *3-pr.*, 8 *11²pr.*, 4 M.	4 (sub.)	21	2300 / 720	1252
b.	Demokratiya†	27,300	597	95	29½	29,700	Nikolaev S.B. & E. Co.	..	1916	Bldg.	..	..	..	..	..	.	..	12 *12-in.*, 20 *5·1-in.*, 12 smaller	4 (sub.)	21	..	—

* Under French protection.

† Building stopped. Not likely to be completed.

Cruising Ships.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal / Oil	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
l. cr.	S.S.S.R. (*ex*-Aurora)	6730	416	55	21	11,600	Petrograd	1900	1903	..	..	..	14 *6-in.*, 5 *6-pr.* A.A., 2 M.	..	20	964 / —	573
,,	Almaz *	3300	363	43½	17½	7,500	..	1903	1904	..	— / 3	..	7 *4·7-in.*, 2 M.	..	19	650 / —	300
,,	Chevonaya-Ukrainia	7600	535½	51½	18½	55,000	Nikolaev	1915	1923	..	..	..	15 *5·1-in.*, 4 *3-in.* A.A., 4 M., 100 mines	2 (sub.)	29½	540 / 690	..
,,	Komintern	6675	440	54½	20½	19,500	Nikolaev	1903	1907	..	..	..	16 *5·1-in.*, 6 *2·2-in.*, 2 *11-pr.*	2 (sub.)	23	1190 / —	595
,,	General Kornilov *	6675	439½	54½	20½	19,500	Sevastopol	1902	1905	..	..	..	16 *6-in.*, 2 *11-pr.*	2 (sub.)	23	1100 / —	595
,,	Lazarev	7600	535⅓	51½	18½	55,000	Nikolaev	1916	Bldg.	..	3 / 1	3	15 *5·1-in.*, 4 *3-in.* A.A., 4 M., 100 mines	2 (sub.)	29½	540 / 690	..
,,	Istomin							Bldg.	Bldg.	..							
,,	Profintern	6800	507¾	50⅓	18⅓	50,000	Reval	1915	1925	..	3 / 1	3	15 *5·1-in.*, 4 *4-in.* A.A., 4 *3-in.*, 4 M.	2 (sub.)	29½	1167 / —	..

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SPAIN.—Armoured Ships.

NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
	tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
Alfonso XIII. *See p. 427.*	15,452	459½	78¾	25½	15,500 I. P. tur.	Ferrol	1913	1916	..	9–4 K.S.	2–1	6–5 K.S.	6–3 K.S.	10 K.S.	3 K.	8 *12-in.*, 20 *4-in.*, 2 *3-pr.*, 2 1., 2 M.	..	19·5	1850 / 20	854
Cataluña	7405	383¾	61	23¼	10,580 *t*	Cartagena	1900	1908	600,000	12–10	2	..	12	10½	..	2 *9·4-in.*, 8 *5·5-in.*, 2 *3-in.*, 8 *6-pr.*	..	18·8 *t*	1178 / —	442
Jaime I. *See p. 427.*	15,700	459½	78¾	25½	15,500 I. P. tur.	Ferrol	1914	1922	..	9–4 K.S.	2–1	6–5 K.S.	6–3 K.S.	10 K.S.	3 K.	8 *12-in.*, 20 *4-in.*, 4 *3-pr.*, 4 *3-pr.* A.A., 2 M.	..	20·2 *t*	1850 / 20	854

a.c.
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SPAIN.—Cruising Ships.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Side. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. Oil.	Complement.
		tons.	ft.	ft.	ft.					£	ins.				knots.	tons.	
l. cr.	**Miguel de Cervantes**	7850	579½	54½	16½	80,000	Ferrol	1928	—	..	3	..	8 *6-in.*, 4 *4-in.* A.A., 2 *3-pr.*, 1 M.	12	33·0	—	560
,,	**Almirante Cervera** *See p. 428.*							1925	—		—					1680	
,,	**Principe Alfonso** *See p. 428.*							1925	1927								
g.b.	**Bonifaz**	787	213¾	30	9½	1100 Y	Cartagena	1911	1912	..	..	..	4 *3-in.*, 2 M.	..	14·0	148 —	121
,,	**Eduardo Dato**	1335	253½	33½	11¼	1700	Ferrol	1923	1925	..	..	..	4 *4-in.*	..	15	324 —	131
,,	**Jose Canalejas**						Ferrol	1922	1924								
,,	**Antonio Canovas del Castillo**							1922	1923								
l. cr.	**Extremadura**	2100	288	36	16¼	7000 T	Cadiz	1900	1902	..	— 2	..	8 *4-in.* (Vickers), 4 *6-pr.*, 4 *1-pr.*	..	19·0	425 —	266
g.b.	**Lauria**	787	213¾	30	9½	1100 Y	Cartagena	1912	1912	..	..	..	4 *3-in.*, 2 M.	..	14·0	148 —	121
,,	**Laya**							1911	1911								
	Recalde	787	213	30	9½	1100 Y	Cartagena	1911	1911	..	..	..	4 *3-in.*, 2 M.	..	13·8*t*	8 —	121
l. cr.	**Reina Victoria Eugenia** *See p. 429.*	6130	462	50	15¾	25,500 P.T.	Ferrol	1920	1922	..	3–1½ —	3	9 *6-in.*, 4 *3-pr.* A.A., 1 *3-in.*, 4 M., 1 L.	4	25·5	1200 230	404
,,	**Don Blas Lezo**	4650	462	46	14½	45,000	Ferrol	1923	1925	..	..	..	6 *6-in.*, 4 *3-pr.* A.A., 4 M.	12	23·0	800	320
,,	**Mendez Nuñez** *See p. 429.*							1922	1924						23·5*t*	500	

Seaplane-carrier Dédalo 10,800 tons, converted 1922, can carry 2 small dirigibles, 2 balloons, and 25 planes.
Motor-launches, M 1, 2, 4, 5, 6; H 1, 3, 5, 6, 40 tons. Training ship Galatea (*ex*-Clarastella), 2,500 tons, bought in Italy. Several mine-trawlers and auxiliaries.
Three 10,000-ton cruisers authorized to be built at Ferrol.
Submarine salvage vessel Kanguro (1917), 3,000 tons, 10 knots, four 2-pr.
Training ship Sebastian Elcano, 3,500 tons (1928).
Three coastguard patrol vessels, 250 tons, building.

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SWEDEN.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Fuel	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.		Coal. / Oil.	
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.b.	**Aran**	3592	287	49½	16·7	6500 I.H.P.	Gothenburg	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub.	17·2 *t*	300 —	287
,,	**Drottning-Victoria** *See p. 430.*	7500	396·7	61	21½	22,000 tur. I.H.P.	Gothenburg	1917	1921	666,000	8–6 K.S.	1½	4 H.S.	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *5·9-in.*, 6 *3-in.*, 2 *6-pr.*, 2 M.	2 sub.	23·0	690 98	450
a.c.	**Fylgia**	4902	377·6	48·5	20·6	12,440 I.H.P. *t*	Stockholm	1905	1907	385,700	4 K.S.	2	..	..	5 K.S.	5 K.S.	8 *5·9-in.*, 10 *6-pr.*, 2 *1-pr.*	2 sub.	22·5 *t*	900 —	328
c.d.b.	**Gustav V.** *See p. 430.*	7500	396·7	61	21½	22,000 tur. I.H.P.	Malmö	1918	1921	666,000	8–6 K.S.	1½	4 H.S.	..	8 K.S.	5 K.S.	4 *11-in.* 8 *5·9-in.*, 6 *3-in.*, 2 *6-pr.*, 2 M.	2 sub.	23·0	690 98	450
,,	**Manligheten**	3780	287	49½	17·4	7400 I.H.P.	Malmö	1903	1904	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub.	17·0	300 —	287
,,	**Oscar II** *See p. 430.*	4584	313·6	50·5	18	9000 I.H.P.	Gothenburg	1905	1907	..	6 K.S.	2	6 K.S.	6 K.S.	7½ K.S.	5 K.S.	2 *8·2-in.*, 8 *5·9-in.*, 8 *6-pr.*, 1 *1-pr.*	2 sub.	18·0	500 —	330
,,	**Sverige** *See p. 430.*	6990	392·7	61	21½	20,000 tur. I.H.P.	Gothenburg	1915	1917	666,000	8–6 K.S.	1½	4 K.S.	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *5·9-in.*, 6 *12-pr.*, 2 *6-pr.*, 2 M.	2 sub.	22·5	690 98	450
,,	**Tapperheten**	3780	287	49½	17·7	6000 I.H.P.	Malmö	1901	1903	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub.	16·5	300 —	287
,,	**Wasa**	3686	287	49½	17	6000 I.H.P.	Stockholm	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub.	16·5	300 —	287

All the ships are now rated as coast-defence battleships, with the exception of the Fylgia. Older coast-defence ships Oden, Thor, Niord (1897, 1899, 1899), 3715 tons, 2 9·8-in., 6 4·7-in. guns. Mine-layer Cles Fleming, 1800 tons, 4 4·7 in., 20 knots, 100 mines; mine-sweepers Sökaren, Sveparen, Sprängeren, and others. Torpedo gunboats Jacob Bagge, Oernen, Psilander, 830 tons, 2 4·7-in., 4 2·2-in., 20 knots. Two gunboats, 388, 589 tons. Depôt ships for submarines, Svea, 3300 tons, Blenda, 460 tons. Aircraft depôt ship Dristigheten (1901), 3620 tons.

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UNITED STATES.—Armoured Ships.

Class.	NAME. Date for Scrapping.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. §	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Arizona** . . 1937 *See p.* 436.	31,400	608	97	28¾	34,000 B. & W. P. tur. (G.)	New York (Navy Yard)	1915	1916	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (45 cal.), 14 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 2 L., 1 catapult, 3 aeroplanes	2 (sub.)	21·0	— 2300	1400
b.	**Arkansas** * . 1935 *See p.* 438.	28,500	562	93¼	28½	28,533 P. tur. *t*	Camden, N.J. (N.Y.S.B.Co.)	1911	1912	964,000	11–5 K.S.	3	..	8–6 K.S.	11 K.S.	6½	12 *12-in.*, 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	—	21·0	— 5100	1430
b.	**California** . . 1941 *See p.* 432.	32,300	624	97½	30¼	28,500 Tur. (G.)	Mare Island (Navy Yard)	1919	1921	..	14 K.S.	..	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*, 2 M., 2 *1-pr.*, 1 catapult, 3 aeroplanes	2 (sub.)	21·5	— 4656	1407
a.c.	**Charleston** . .	9700	426½	66	22½	27,500 B.&W.	Newport News	1904	1906	563,030	4 H.S	3	4 H.S.	..	4 H.S.	..	12 *6-in.*, 4 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.*	..	22·0	1800 —	784
a.c.	**Charlotte** (*ex*-North Carolina) .	14,500	504½	72¾	25	26,038 B. & W. *t*	Newport News	1906	1908	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 12 *3-in.*, 2 *3-in.* A.A., 4 *6-pr.*	4 (sub.)	21·9 *t*	2160 —	964
b.	**Colorado** . . 1942 *See p.* 431.	32,600	624	97½	30½	28,900 B. & W. tur.	N.Y.S.B. Co.	1921	1923	1,383,000	13½–12 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	2 (sub.)	21·0	— 4570	1407

§ The sums given in this column are exclusive of the cost of armour and armament according to the system of making appropriations in the estimates.
‡ Including armour, but not armament.

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b.	**Florida*** 1934 *See p. 439.*	21,825	521½	88½	28½	27,036 B. & W. P. tur.	New York (Navy Yard)	1910	1911	1,280,000	11	..	10	..	11	5	10 *12-in.*, 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr*, 4 M., 1 catapult, 3 aeroplanes.	—	22·1	— / 4900	1324
a.c.	**Frederick** (*ex*-Maryland)	13,680	504	69½	24½	28,059 B. & W.	Newport News	1903	1905	756,400	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.*	2 (sub.)	22·4 *t*	2100 / —	898
a.c.	**Huntington** (*ex*-West Virginia)	13,680	504	69½	24½	31,437 B. & W.	Newport	1903	1905	798,310	6–3½ K.S.	4	5 K.S.	12 H.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 4 *3 pr.*	2 (sub.)	22·1 *t*	2100 / —	898
a.c.	**Huron** (*ex*-South Dakota)	13,680	504	69½	26	28,598 B. & W.	S. Francisco.	1904	1907	770,570	14 K.S.	4	5 K.S.	4 K.S.	6 K S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.*	2 (sub.)	22·0	2200 / —	899
b.	**Idaho** 1939 *See p. 433.*	32,000	624	97½	30	32,000 B. & W. P. tur. (G.)	Camden, N.J. (N Y.S.B. Co.)	1917	1919	1,485,000	6–3½ K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 2 L,, 1 catapult, 3 aeroplanes.	2 (sub.)	21·3	— / 5271	1374
a.c.	**Lexington**	33,000	888	106	30	180,000 tur.electric	Quincy, Mass.	..	1927	9,000,000	..	..	..	..	..	..	8 *8-in.*, 12 *5-in.* A.A. 4 *6-pr.* Stowage for 72 aircraft. Fitted with a catapult.	4	33	Oil	..
b.	**Maryland** 1941 *See p. 431.*	32,600	624	97½	30½	28,900 T.	Newport News	1920	1921	1,383,000	13½–12 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes.	2 (sub.)	21·1	— / 4570	1407
b.	**Mississippi** 1938 *See p. 433.*	32,000	624	97½	30	32,000 B. & W. Cur. t. (G.)	Newport News	1917	1917	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes.	2 (sub.)	21·1	— / 3271	1374

* See note, p. 333.

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UNITED STATES.—Armoured Ships—*continued*.

Class.	NAME. Date for Scrapping.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Missoula**	14,500	504½	72¾	25	27,938 B. & W. *t*	Newport News	1906	1908	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 12 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.*,	4 (sub.)	22·2 *t*	2160 / —	964
b.	**Nevada** †. 1936 *See pp.* 434 *and* 435.	27,500	583	95¼	28½	23,312 Y. Cur. tur.	Quincy, Mass. (Fore River)	1914	1916	1,211,342	13½–8 K.S	1½–3	.. K.S.	13½ K.S.	18–16 K.S.	..	10 *14-in.* (45 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes.	2 (sub.)	20·5	— / 2000	1360
b.	**New Mexico** . 1939 *See p.* 433.	32,000	624	97½	30	27,500 B. & W. Electric drive	New York . (Navy Yard)	1917	1918	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	2 (sub.)	21·0	— / 3271	1414
b.	**New York** * . 1935 *See p.* 437.	29,600	573	95¼	28½	29,687 B. & W.	New York . (Navy Yard)	1912	1914	1,315,114	12–4 K S	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.* (45 cal.), 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	—	21·5	— / 5200	1450
b.	**Oklahoma** † . 1936 *See pp.* 434 *and* 435.	27,500	583	95¼	29¾	21,703 B. & W.	New York .	1914	1916	2,200,000	13½–8 K.S.	1½–3	K.S.	13½ K.S.	18–16 K S.	..	10 *14-in.* (45 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	2 (sub.)	20·6	— / 2000	1360
b.	**Pennsylvania** . 1937 *See p.* 436.	31,400	608	97	29¾	31,500 B. & W. Cur. tur.	Newport News	1915	1916	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (45 cal.), 14 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M.	2 (sub.)	21·0	— / 2300	1380
a.c.	**Pittsburg** .	13,680	504	69½	24½	28,600 Nic.	Philadelphia (Cramp)	1903	1905	799,340	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.*	2 (sub.)	22·4 *t*	2100 / —	898
a.c.	**Rochester** .	8,150	384	65	23¼	16,600	Philadelphia (Cramp)	1891	1893	..	4	2½	..	..	6–6½	..	4 *8-in.*, 8 *5-in.*, 2 *3-in.* A.A., 2 *3-pr.*	..	21·0	1100 / —	662

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a.c.	**St. Louis**	9,700	426½	66	22½	27,264 B. & W.	Philadelphia (Cramp)	1905	1906	563,030	4 K.S.	3	4–3	..	4 K.S.	..	12 *6-in.*, 4 *3-in.*, 2 *3-in* A.A., 2 *3-pr.*	..	22·1 *t*	1800 —	784
A.C.	**Saratoga**	33,000	888	106	30	180,000 tur.electric	N.Y. Shipbuilding Co.	1925	1927	..	..	..	..	..	..	..	8 *8-in.*, 12 *5-in.* A.A., 4 *6-pr.*, stowage for 72 aircraft. Fitted with a catapult	4	33½	..	..
a.c.	**Seattle** (*ex*-Washington)	14,500	504½	72¾	25	27,152 B. & W. *t*	Camden, N.J.	1905	1906	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 12 *3-in.*, 2 *3-in.* A.A., 4 *6-pr.*, 1 catapult	4 (sub.)	22·3 *t*	2060 —	964
b.	**Tennessee** * 1940 *See p.* 432.	32,300	600	97¼	30½	28,500 T.	New York Navy yard	1919	1920	..	14 K.S.	..	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	2 (sub.)	21·0	— 4656	1407
b.	**Texas** * 1935 *See p.* 437.	29,600	573	95¼	28½	28,100 B. & W. *t*	Newport News	1912	1914	1,166,000	12–4 K.S.	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.* (45 cal.), 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	—	21·0	— 5200	1450
b.	**Utah** * 1934 *See p.* 439.	21,825	521½	88¼	28½	28,477 B. & W *t*. P. tur	Camden, N.J	1909	1911	813,500	11	..	10	..	11	5	10 *12-in.*, 12 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 4 M., 1 catapult, 3 aeroplanes	—	21·0	— 4990	1324
b.	**West Virginia** 1942 *See p.* 431.	32,600	624	97½	30½	28,900 T.	Newport News	1921	1923	1,383,000	13½–12 K.S.	..	.	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	2 (sub.)	21·0	— 4570	1407
b.	**Wyoming** * 1934 *See p.* 438.	28,500	562	93¼	29¾	31,437 B. & W. P. tur. *t*	Philadelphia	1911	1912	963,800	11–9 K.S.	..	..	8–6 K.S.	11 K.S.	8	12 *12-in.*, 16 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr*, 2 M., 1 catapult, 3 aeroplanes	—	21·2	— 5109	1430

* Modernised in 1927. Modernisation included fitting of bulge protection, protection of decks against aerial attack, conversion to oil burning, installation of 3-in. A.A. battery, addition of catapults, alteration to masts. † Being modernised. ‡ Including armour, but not armament.

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UNITED STATES.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Fuel.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.		Coal. / Oil.	
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
l. c.	No. 26	..	..	..	..	..	Bethlehem, S. B. Corp., Fore River	..	..	..	..	..					
„	No. 27. Chester	..	..	..	..	..	American Brown Boveri Elec. Corp.										
„	No. 28	10,000	585	65	19	110,000	Puget Sound Navy Yard	Bldg.					9 *8-in.*, 4 *5-in.* A.A.	6	32·7	..	..
„	No. 29. Chicago	..	..	..	..	..	Mare Island Navy Yard										
„	No. 30. Houston	..	..	..	..	..	Newport News S. B. & D. D. Co.	..	..	..	..	..					
„	No. 31. Auguston																
	Birmingham	3750	420	47	16¾	15,670 Express	Quincy, Mass.	1907	1908	301,000	2–1½	..	4 *5-in.*, 2 *3-in.*, 1 *3-in.* A.A., 2 *3-pr.*	2 sub.	24·3 *t*	1433 / —	330
„	Chattanooga	3200	309	44	15¾	5303 B.&W.	Elizabeth Port	1903	1904	212,325	2	..	8 *5-in.*, 1 *3-in.* A.A., 6 *6-pr.*	..	16·65 *t*	740 / —	302
„	Chester	3750	420	47	16¾	16,000 Nor. turb.	Bath, Me.	1907	1908	337,000	2–1½	..	4 *5-in.*, 2 *3-in.*, 1 *3-in.* A.A., 2 *3-pr.*	2 sub.	26·5 *t*	1433 / —	386
„	Cincinnati	7500	555½	55⅓	14¼	90,000	Tacoma, Wash.	1921	1924	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 catapults, 3 aeroplanes	6	34·4	— / 1800	450
„	Concord						Philadelphia (Cramp)		1923					6	33·5		
	See p. 440.																
„	Cleveland	3200	308¾	44	15¼	5300 B.&W.	Bath, Me.	1901	1903	212,325	2	..	8 *5-in.*, 1 *3-in.* A.A., 6 *6-pr.*	..	16·4 *t*	737 / —	302
„	Denver	3200	308¾	44	15¾	5300 B.&W.	Philadelphia	1902	1904	212,325	2	..	8 *5-in.*, 1 *3-in.* A.A., 6 *6-pr.*	..	16·8	700 / —	303
„	Des Moines		309¾				Quincy, Mass.								16·6		
„	Detroit	7500	555½	55⅓	14¼	90,000	Quincy, Mass. (Bethlehem)	1923	1923	Cost and fee.	2½ side	..	12 *6-in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 catapults, 3 aeroplanes	6	34·6	— / 1800	450
	See p. 440.																
„	Galveston	3200	309	44	15¾	5073 B. & W.	Richmond, Va.	1903	1905	212,325	2	..	8 *5-in.*, 6 *6-pr.*	..	16·4	740 / —	330

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A.C.	Langley	12,700	542½	65¼	19	7160 *t*	..	1912	1913	..	..	..	4 *5-in.*, 30 aeroplanes	..	15	— / 2006	410
l. c.	Marblehead						Philadelphia (Cramp)	1923	1924						38·7		
„	Memphis .								1925						33·7	—	
	See p. 440.	7500	555½	55⅓	14¼	90,000				Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A.; 2 *3-pr.*, 2 catapults, 3 aeroplanes.	6		/ 1800	450
..	Milwaukee .						Tacoma, Wash.	1921	1923						34.6		
	See p. 440.																
„	Albany .							1899	1900				8 *5-in.*, 2 *3-pr.*, 1 *3-in.* A.A.	..	20·5	782 / —	
		3430	354·8	43⅜	17	7500	Armstrong			..	3½ slope	..					320
„	New Orleans							1896	1898				8 *5-in.*	..	20·0	693 / —	
„	Olympia . .	5865	344	53½	21½	17,813	U.I.W., 'Frisco	1892	1894	..	4⅜ slope	..	10 *5-in.*, 4 *6-pr.*, 2 *3-in.* A.A.	..	21·7 *t*	1170 / —	382
„	Omaha .						Tacoma, Wash.	1920	1923						34·9		
„	Raleigh .	7500	555½	55⅓	14¼	90,000	Quincy, Mass.	1922	1924	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A.; 2 *3-pr.*, 2 catapults, 3 aeroplanes	6	34·6	— / 1800	450
„	Richmond .						Philadelphia (Cramp)	1921	1923						34·2		
	See p. 440.																
„	Salt Lake City						American Brown Boveri Electric Corp. New York (Navy Yard)	..	..	..	..	..	10 *8-in.*, 4 *5-in.* A.A., 2 catapults, 6 planes	6	32½	..	620
„	Pensacola .	10,000	585	65¼	19½	..											
„	Salem . . .	3750	423	47	16⅜	22,242 W.T. turb.	Quincy, Mass.	1907	1908	301,000	2–1½	..	4 *5-in.*, 2 *3-in.*, 1 *3-in.* A.A., 2 *3-pr.*	2 (sub.)	25·9 *t*	1433 / —	386
„	Trenton . .	7500	555½	55⅓	14¼	90,000	Philadelphia (Cramp)	1923	1924	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 catapults, 3 aeroplanes	6	33·7	— / 1800	450
	See p. 440.																
A.T.	Wright . .	11,000	448	58	30	6000	Zietgen and Lang New York	1920	1921	..	..	..	2 *5-in.*, 2 *3-in.* A.A., 27 planes	..	15	— / 1630	313

§ Prices exclusive of armament.

GUNBOATS.—Tulsa (1923), Asheville (1920), 1575 tons, 12 knots, 3 4-in., 2 3-pr., 2 1-pr., 4 M.; Elcano (1886), 620 tons, 11 knots, 4 4-in., 4 3-pr.; Helena (1897) 1392 tons, 15½ knots, 8 4-in., 4 3-pr.; Sacramento (1914), 1425 tons, 12½ knots, 3 4-in., 2 3-pr., 2 1-pr.; and 7 others used for training purposes.

RIVER GUNBOATS.—Guam (1927), Tutuila (1928), 380 tons, 14 knots, 2 3·3-in., 8 M.; Pigeon (1919), Penguin (1918), 950 tons, 14 knots, 2 3-in. A.A.; Palos, Monocacy (1914), 190 tons, 13¼ knots, 2 6-pr.; Villalobos (1897), 370 tons, 11 knots, 4 3-pr.; Pampanga (1888), 10 knots, 4 3-pr.; Panay, Oahu, 440 tons, 15 knots; Luzon, Mindanao, 575 tons, 16 knots.

MINE-LAYERS.—San Francisco (1890), 4080 tons, 19 knots, 4 5-in., 4 6-pr., 2 3-in. A.A., 4 1-pr., 300 mines; Baltimore (1889), 4413 tons, 20 knots, 4 5-in., 4 6-pr., 2 3-in. A.A., 2 1-pr., 300 mines; Oglala (1918), 3800 tons, 20 knots, 1 5-in., 1 3-in. A.A., 350 mines; 14 light mine-layers, *ex*-T.B.D.'s. See Flotilla Tables, p. 364.

MINE-SWEEPERS.—42 in number (1918, 1919), 950 tons, 14 knots.

AIRCRAFT TENDERS.—Aroostook (1918), 3800 tons, 20 knots; Patoka (1919), 16,800 tons, 10·9 knots, 2 5-in.; Heron (1918), 950 tons, 14 knots, 2 3-in. A.A.; Jason (1913), 19,250 tons, 14·3 knots, 4 4-in., 27 planes.

DESTROYER TENDERS.—Dobbin, Whitney, Altair, Denebola, Rigel, Melville, Black Hawk, Bridgeport.

SUBMARINE TENDERS.—Holland (1926), 10,000 tons, 16 knots, 8 5-in., 4 3-in. A.A., 2 6-pr.; Bushnell, Fulton, Canopus, Camden, Savannah, Beaver, Rainbow, and Argonne.

REPAIR SHIPS.—Medusa (1924), 9960 tons, 16 knots, 4 5-in., 2 3-in. A.A., 2 6-pr.; Vestal, Prometheus (1909), 12,585 tons, 16 knots, 4 5-in. 27 submarine chasers mounting 1 3-in. gun.

1 Aircraft carrier, 13,800 tons, 29 knots, projected, but no money voted. 15 10,000-ton cruisers projected, but no money voted for these.

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SHIPS OF THE LESSER NAVIES.

Austria.—Patrol vessels: Neretva, Compo (1918), 130 tons, 16 knots; Fogas (1916), 62 tons, 16 knots, and Pozsony (1918), 130 tons, 16 knots. These vessels have been disarmed and are unserviceable.

Bulgaria.—Under the terms of the naval clauses of the Peace Treaty, Bulgarian warships of all classes, existing or under construction, were surrendered to the Allied and Associated Powers or broken up. All vessels are under the Ministry of Commerce for police and preventive duties; torpedo boats Derzki, Khrabri, Smelyi, and Strogi, two minesweepers and some motor boats of little value.

China.—Cruisers: Chao Ho (Elswick, 1912, 2,600 tons), Ying Jui (Barrow, 1912, 2750 tons)—two 6-in., two 4-in., two 3-in., six 3-pr., two 1-pr., two torpedo tubes; Hai Yung, Hai Chou, and Hai Chen (Germany, 1897–1898, 2,950 tons)—three 5·9-in., eight 4-in. and smaller, one submerged torpedo tube; Hai Chi (Armstrong's, 1899, 4,300 tons)—two 8-in., ten 4·7 in., twelve 3-pr., ten maxims, five torpedo tubes. Destroyers: Chien Kang, Tung An, and Yu Chang, of 390 tons, speed 30 knots, armament: two 3-in., four 3-pr., and two 18-in. T.T. Torpedo boats: Seventeen. River gunboats: Twenty-two. Also several despatch vessels and torpedo gunboats. There are, in addition, a few gunboats and miscellaneous vessels belonging to the water-police of the Kwang Tung Province.

Colombia.—Gunboat Chercinto (1897), 640 tons; four Guardacostas (Yarrow, 1913). River gunboats, General Nerino and Esperanza, 40 tons. Three revenue cruisers building, 150 tons, 13 knots, two 3-pr.

Cuba.—Light cruiser, Cuba, 2055 tons, 6000 H.P. 18 knots two 4-in., four 6-pr., four 3-pr., four 1-pr., 2 M., and the training ship Patria, 1220 tons, 16 knots; also 5 gunboats, Habana, Pinar del Rio, 80 tons, 12 knots, one 1-pr.; 24 de Febrero, 10 de Octubre, 218 tons, 12 knots, one 3-pr., two 1-pr.; Baire, 500 tons, 14 knots, four 3-in., two 3-pr., 1 M.

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Czecho-Slovakia.—There are two river gunboats for training purposes and four small minelayers.

Ecuador.—The torpedo cruiser Libertador Bolivar, of no fighting value, mine-laying torpedo boat Tarqui, and special vessel Cotopaxi.

Esthonia.—The Navy consists of destroyers Vambola (*ex*-Kapitan Kingsbergen) (1918), 1260 tons, 35 knots, four 4-in. guns, 2 M., one 2-pr., 9 T.T., 80 mines, and Lennuk (*ex*-Avtroil) (1917), 1350 tons, 35 knots, five 4-in. guns, 2 M., one 2-pr., 9 T.T., 80 mines. Two mine-layers, two minesweepers, one ice-breaker, and Peipus Lake gunboats Ahti and Tartu. Torpedo boat Sulev (*ex* German A 32) (1917), 243 tons, 26 knots, two 3-in., 2 torpedo tubes; gunboat Laine, river gunboat Mardus.

Finland.—Patrol boats Klas Horn (*ex* Posadnik), Uusimaa, Hämeenmaa, Matti Kurki (*ex* Voevoda), Karjala (*ex* Filin), and Turunmaa (*ex*-Orlan); also 2 torpedo boats, S1, S5; 3 C.M.B.'S, and 2 C.M.B.'s building at Messrs. Thornycroft's; 6 ice-breakers, and three mine-sweepers and several motor launches. Three submarines are building at Chrichton Vulcan, Abo, 450 tons, and an additional submarine is projected.

Hayti.—Four special service vessels, Nord Alexis, 1230 tons, Veretieres, 270 tons, 17 Decembre, 851 tons, Pacifique, 488 tons.

Hungary.—Patrol vessels: Debreczen, 138 tons, four 3-in., 4 M.; Kecskemet, 131 tons, two 3-in., 4 M.; Siofok, 59 tons, one 3-in., 2 M.; Szeged, 131 tons, four 3-in., 4 M.; also 12 motor launches.

Latvia.—Gunboat Virsaitis (*ex* German M68), 480 tons, two 3-in., two 6-pr., one 3-in. A.A., one torpedo tube; 1 ice-breaker, Krisjanis Valdemars; 2 submarines, Ronis and Spidola, $\frac{390}{514}$ tons $\frac{\text{surface}}{\text{submerged}}$ displ., launched 1926, completed 1927, $\frac{14\frac{1}{2}}{9\frac{1}{4}}$ knots, one 3-in., 2 M., 6 torpedo tubes, complement 27; 2 mine-sweepers, Imanta, Viesturs, 225 tons, 14 knots, one 3-in., 4 M., 30 mines, completed in 1926.

Mexico.—Coast defence vessel Anahuax, 3162 tons, 15 knots, two 9·4-in., four 4·7-in., four 6-pr., 2 M., 2 L.; gun-vessels, Tampico and Vera Cruz (Elizabeth Port, New Jersey, 1903); displacement, 980 tons; armament, two 4-in. Q.F., four 6-pr.; 16 knots; fitted to

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serve as transports for 200 troops, Bravo 1200 tons; 2600 I.H.P.; 17 knots (Leghorn, 1904), and Aguas Prieta, 1200 tons; 1800 I.H.P.; 15 knots. Training ship Zaragoza, 1200 tons, 1300 H.P., 15 knots, five 4·7-in., and one 6-pr. Q.F. Two revenue cutters. A small aircraft establishment.

Peru.—Almirante Grau and Coronel Bolognesi, cruisers, 3200 tons; (Barrow, 1906); two 6-in., eight 3-in., eight maxim; 2 submerged torpedo tubes; 24 knots; converted to oil-burning 1925; also Lima (parent ship for submarines). Gunboat America. Destroyer, Rodriguez, 500 tons. Submarines R1 and R2, built at New London, S. and E. Co., Croton Works, U.S.A., $\frac{576}{682}$ tons, $\frac{14\frac{1}{2}}{10}$ knots, one 3-in., 4 torpedo tubes, completed in 1926. Submarines R3, R4, building at Electric Boat Co. (New London Ship and Eng. Co., Croton, Mass.), same particulars as R1 and R2, will be completed in 1929.

Poland.—Five *ex*-German torpedo boats for police purposes. Gunboats, Komendant Pilsudski, 350 tons, carrying several small guns, and General Haller, built in Finland. Training ship, Lwow. Monitors, Warszowa, Horodyszcre, Krakow, Wilno, Torun, Pinsk. Two destroyers, Burza, Wicher, are building at Blainville, France, 1515 tons, 33,000 H.P., 33 knots, four 5·1-in., one 2·9-in. A.A., 6 torpedo tubes. Three submarine mine-layers are building in France, Rys at Ch. Loire, Nantes; Zbik at Ch. Navals Français, Caen; Wilk at Ch. Augustin Normand, Le Harve; $\frac{964}{1230}$ tons, 1800 H.P., 14 knots surface, 9·5 knots submerged; one 4-in., one 2-pr., 6 torpedo tubes, 40 mines. Six more are projected.

Portugal.—The cruiser Adamastor, 1760 tons, completed at Leghorn in 1897, reconditioned in 1925, two 4·7-in., four 4·1-in., four 3-pr., 3 maxim, 3 torpedo tubes (14-in.). The mine-layer Vulcano was built by Messrs. Thornycroft in 1909. There are other small boats, and two sloops sold out of the British Navy have been added. These are the Republica (*ex*-Gladiolus), and Carvalho Araujo (*ex*-Jonquil). There is also the coast defence vessel Vasco da Gama (1876), 3030 tons, 15·5 knots, mounting two 8-in., one 4-in., one 3-in., six 3-pr., reconstructed 1903. Portugal has the old destroyer Tejo and four others, Douro, Tamega, Guadiana, and Vouga (1913–24), 700 tons, 11,000 H.P., 30 knots, two torpedo tubes, also four *ex*-Austrian F boats for police duties. Submarines Espadarte, 245–300 tons, 13 knots, and Foca, Golfinho, and Hidra (Laurenti); 260–389 tons

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13–8·5 knots, 2 T.T. Two gunboats are building at Lisbon, Damas, Diu, 400 tons, 700 H.P., 13 knots, two 3-in., two 3-pr.; and two more, the Lagos and Faro, are to be built as fishery inspection vessels. Gunboat Zaire, 400 tons, 13 knots, two 3-in., two 3-pr., completed 1927 at Lisbon, and 10 others.

Rumania.—Two flotilla leaders, to Messrs. Thornycroft's design, are building at Pattison's Yard, Naples, 1968 tons, 38 knots. Length 334¾ ft., beam 31½ ft., draught 11¼ ft. Armament, five 4·7 in., one 3 in. A.A.; two triple torpedo tubes.

One submarine is building at Quarnaro, Fiume. Displacement, 640 tons surface, 817 tons submerged.

There is the old protected cruiser Elisabeta, now a hulk used as a boys' barracks.

River Monitors.—Bucovina (1916), 540 tons, 12 knots, two 4·7-in., two 3-pr., two 11-pr. A.A.; Ardeal (1905), 440 tons, 10 knots, two 4·7-in., one 3-pr., one 3·5-in. A.A.; Basarabia (1915), 530 tons, 12 knots, two 4·7-in., two 3-pr., two 11-pr. A.A.; Lascar Catargiu, Ioan Bratianu, Milhail Kogalniceanu, Alexandru Lahovary (1907–08), 670 tons, 13 knots, three 4·7-in., two 3-pr., one 3-in. A.A., 2 M.

Flotilla Leaders.—Marasti, Marasesti (*ex*-Italian Nibbio, Sparviero), completed 1917–18, 1460 tons, 35 knots, five 4·7-in., four 3-in. A.A., 2 M., 2 twin torpedo tubes, 50 mines.

Seven vedettes, 50 tons.

Gunboats.—Stihi, Lepri Remus, Dumitrescu, Ghiculescu, completed 1916–17, 350 tons, 15 knots, two 3·9-in., 2 M. These are *ex*-French vessels.

There are also five armed motor boats, several police craft (*ex*-Austrian T.B.D.'s, Naluca, Sborul, Zmeul), and armed launches.

A submarine depôt ship 2264 tons is building at Cantiere Navali de Quarnavo, Fiume.

Siam.—The gunboats Ratnakosindr, 1925, 920 tons, two 6-in., four 3-in. H.A., 12 knots; Bali and Sugrib, 580 tons, 11·5 knots, one 4·7-in., five 6-pr., 2 M.; Muratha, 530 tons, 11·4 knots, one 4·7-in., four 6-pr., 3 M.; and Mongkut, 700 tons, 11 knots, two 4·7-in., two 6-pr., three 3-pr., launched 1898, 1901, 1898, and 1887 respectively. One despatch vessel, Pi Sua Nam, 195 tons. Two 380-ton, 27-knot destroyers, built at Kobe, Sua Gamron Sindhu and Sua Tayanchou. Phra Ruan (*ex*-British destroyer Radiant, 1917), 4 torpedo boats. One coastal motor boat, 2 torpedo tubes (18-in.). Training ship Show Phraya (1919), 840 tons, 16 knots.

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Turkey.—The old battleship Torghud Reis (*ex*-German Weissenburg, 1891), refitted 1927, 9900 tons, 17 knots, six 11-in., three 15-pr., two 2·5-in. A.A., 2 submerged torpedo tubes. The battle-cruiser Yavouz Sultan Selim (*ex*-Goeben), 24,000 tons, 25 knots. Armament: ten 11-in., twelve 5·9-in., twelve 22-pr., 2 M., 1 L., 4 submerged torpedo tubes. Light cruisers: Hamidieh (Elswick, 1904), 3,830 tons, speed 22 knots, armament: two 5·9-in., four 3-in., four 3-pr., 2 torpedo tubes; Medjidieh (Philadelphia, 1903), refitted 1927, 3,300 tons, speed 22 knots, armament: four 5·1-in., four 3-in., 4 M. Destroyers, three; torpedo boats, four; and several gunboats, mine-layers, and yachts. Submarines Ikindji-in-Uni and Birindji-in-Uni, completed 1928, and one building at Fijenoord Works, Rotterdam, $\frac{433}{556}$ tons, $\frac{13\frac{3}{4}}{9\frac{3}{4}}$ knots, one 3-in., 1 M., 6 torpedo tubes.

An order is to be placed abroad for two destroyers, four submarines, and six submarine chasers.

Uruguay.—Light cruiser Monte Video, torpedo-gunboat Uruguay, built at the Vulcan Yard, Stettin; 1400 tons; two 4·7-in., four 3-in., six 1-pr., four Maxims; two 18-in. torpedo tubes. Surveying ships Baron de Rio Branco, Zapican, Charrua, built in Germany.

Venezuela.—Gunboats Marescal Sucre (*ex*-Spanish Isla de Cuba), drill ship bought from United States, 1912. General Salom, Miranda. Armed tug José Felix Ribas. Transport Antonio Diaz.

Yugoslavia.—Two submarines, Hrabri, Nebojsca, completed at Armstrong's 1928, displacement 975 tons surface, 1164 tons submerged; speed $15\frac{3}{4}$ knots surface, 10 knots submerged; mount two 4-in., 6 torpedo tubes. Two additional submarines are building in France at the Chantiers de la Loire, surface displacement 620 tons. Two coastal motor boats, built at Thornycroft's, completed in 1927. Old cruiser Dalmacija (*ex*-German Niobe), refitted 1926, 2600 tons, is used as a gunnery and general training ship. There are four *ex*-Austrian river monitors, Vardar, Drava, Sava, Morava, 430–600 tons, mounting two 4·7-in.; eleven *ex*-Austrian T.B.D.'s, two patrol boats, six mine-layers, four mine-sweepers (*ex*-Austrian T.B.D.'s), five transports, one training ship, one submarine depôt ship, and auxiliary craft.

Four patrol vessels are building at Sartid's, Smedereva, 80 tons displacement, 5 ft. draught, 14 knots, to be armed with one 3-in. A.A., 2 machine guns.

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BRITISH AND FOREIGN FLOTILLAS.

Great Britain.

Flotilla Leaders.

Name or Number.	Built by.	Completed.	Dimensions. Length (Extreme).	Beam.	Draught.	Number of Screws.	Standard Displacement. (Wash. Treaty.)	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity. Oil.
			ft. ins.	ft. ins.	ft. ins.		Tons.		Knots.				Tons.
Codrington	Swan Hunter ..	Bldg.											
Abdiel	Cammell Laird ..	1916											
Grenville										3 4-in., 1 2-pr., 1 M., 4 L., Mine-layer. 4 4-in., 2-pr., 1 M., 4 L.			
Seymour			325	31 9	10 9 mean, 12 0 max.	3	1310	36,000	34		2 D.	130 to 140	515
Saumarez		1916											
Shakespeare	Thornycroft ..	1917											
Spenser	,, ..	1917											
Wallace	,, ..	1919								5 4·7-in. 1 3-in. A.A. 2 2-pr. A.A. 1 M., 4 L.			
Keppel	,, ..	1925	329	31 11	12 4	2	1480	40,000	36		2 T.	182	500
Broke, *ex*-Rooke ..	,, ..	1925											
Bruce		1918											
Douglas		1918											
Campbell	Cammell Laird ..	1918								5 4·7-in. 1 3-in. A.A. 2 2-pr. A.A. 1 M., 4 L.			
Mackay, *ex*-Claverhouse		1919	332 6	31 9	12 3	2	1530	40,000	36·5		2 T.	182	500
Malcolm		1919											
Montrose	Hawthorn Leslie	1918											
Stuart	,, ,, ..	1918											

Destroyers.

Name or Number.	Built by.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Standard Displacement. (Wash. Treaty.)	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Acasta	Brown ..												
Achates	Brown ..												
Acheron													
Active	Hawthorn Leslie	Bldg.	..	..	..	..	..	..	..	.. ..	..	..	..
Antelope	Hawthorn Leslie												
Antony	Scotts ..												
Ardent	Scotts ..												
Arrow	Vickers Armstr.												
Amazon (*T*)	Thornycroft ..	1927	323	31½	9	2	1330	42,270	37·96	4 4·7 in., 2 2-pr.	2 T.	140	433
Ambuscade (*Y*) ..	Yarrow	1927	322	31	8¼	2	1210	32,850	37·19	4 4·7-in., 2 2-pr.	2 T.	140	385
Admiralty "S" Class:													
Sabre	Stephen	1918											
Shamrock	Doxford	191											
Saladin	Stephen	1919	276	26¾	10⅝	2	905	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Sardonyx	,, ...	1919											
Tactician	Beardmore ..	1918											
Tara	,, ..	1918	276	26¾	10⅝	2	905	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 S.	98	301
Scimitar	Brown	1918											
Scythe	,, ...	1918											
Seabear	,, ...	1918											
Seafire	,, .. .	1918											
Searcher	,, ...	1918											
Seawolf	,, ...	1918											
Sepoy	Denny	1918											
Seraph	,, ...	1918											
Serapis	,, ...	1919											
Serene	,, ...	1919											
Sesame	,, ...	1919											
Sirdar	Fairfield	1918	276	26¾	10⅝	2	905	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Somme	,, ...	1918											
Steadfast	Palmer	1919											
Sterling	,, ...	1919											
Spindrift	Fairfield	1919											
Turbulent	Haw. Leslie ..	1919											
Tenedos	,, ...	1919											
Thanet	,, ...	1919											
Thracian	,, ...	1922											
Stormcloud	Palmer	1920											
Strenuous	Scott	1919											
Stronghold	,, ...	1919											

Torpedo tubes: S. = single. D. = double. T. = triple.

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Great Britain—*continued.*

Name or Number.	Built by.	Completed.	Dimensions. Length (extreme).	Beam.	Draught.	Number of Screws.	Standard Displacement. (Wash. Treaty).	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity. Oil. Tons.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				
Admiralty "S" Class—contd.													
Sturdy	Scott	1919											
Sportive	Swan Hunter	1918											
Sparrowhawk	" "	1918											
Splendid	" "	1918	276	26¾	10⅝	2	905	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Simoom	Brown	1918											
Swallow	Scott	1918											
Tilbury	Swan Hunter	1918											
Tintagel	" "	1918											
Turquoise (*Y*)	Yarrow	1919											
Tuscan (*Y*)	"	1919	273½	25¾	9⅝	2	750	23,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	256
Tyrian (*Y*)	"	1919											
Tribune	J. S. White	1918											
Trinidad	" "	1918											
Trojan	" "	1918	276	26¾	10⅝	2	905	27,000	36	3 4-in, 1 2-pr., 1 M., 4 L.	2 D.	98	301
Truant	" "	1919											
Trusty	" "	1919											
Tourmaline (*T*)	Thornycroft	1919	275¾	27½	10½	2	905	29,000	36				
Senator	Denny	1918											
Shark	Swan Hunter	1918											
Scout	Brown	1918	276	26¾	10⅝	2	905	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Scotsman	" "	1918											
Torch (*Y*)	Yarrow	1918	273½	25¾	9⅝	2	790	23,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	256
Shikari	Doxford / Chatham	1924	276¼	26¾	10⅝	2	905	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Admiralty "V" Class:													
Vansittart	Beardmore	1919											367
Venomous	Brown	1919											353
Verity	" "	1919											353
Volunteer	Denny	1919	312	29½	10⅜	2	1120	27,000	34				370
Veteran	Brown	1919											363
Wanderer	Fairfield	1919											367
Witch (*T.*)	Thornycroft / Devonport	1925	312	30¼	10·9	2	1140	30,000	35	4 4·7 in., 2 2-pr., 1 M., 4 L.	2 T.	130	365
Wishart (*T*)	Thornycroft	1920											374
Wren	Yarrow	1923											370
Whitshed	Swan Hunter	1919											368
Wild Swan	" "	1919											368
Witherington	J. S. White	1919											365
Wivern	" "	1919	312	29½	10⅜	2	1120	27,000	34				365
Wolverine	" "	1920											365
Worcester	" "	1922											365
Whitehall	Swan Hunter / Chatham	1925											365
Walpole	Doxford	1918											
Whitley	" "	1918											
Waterhen	Palmer	1918	312	29½	10⅜	2	1100	27,000	34				367
Wryneck	" "	1918											
Windsor	Scott	1918											
Wrestler	Swan Hunter	1918											
Woolston (*T*)	Thornycroft	1918	312	30¼	10¼	2	1120	30,000	35	4 4in., 1 2-pr., 1 M., 4 L.	2 T.	120	374
Wolsey (*T*)	"	1918											374
Wessex	Haw. Leslie	1918	312	29½	10·7	2	1100	27,000	34				369
Winchester	J. S. White	1918	312	29½	10·7	2	1100	27,000	34				369
Wolfhound	Fairfield	1918	312	29½	10·7	2	1100	27,000	34				369
Westminster	Scott	1918											
Westcott	Denny	1918											
Wakeful	Brown	1917											
Walker	Denny	1918											
Walrus	Fairfield	1918											
Warwick	Haw. Leslie	1918											
Watchman	Brown	1918											
Whirlwind	Swan Hunter	1918	312	29½	10·7	2	1100	27,000	34				
Winchelsea	J. S. White	1918								4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120	367
Vanessa	Beardmore	1918											
Vanity	"	1918											
Voyager	Stephen	1918											
Vidette	"	1918											
Vivien	Yarrow	1918											

Y = Yarrow design. *T* = Thornycroft design.

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Great Britain—*continued.*

Name or Number.	Built by.	Completed.	Dimensions. Length. (Extreme)	Beam.	Draught.	Number of Screws.	Standards Displacement. (Wash. Treaty.)	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Admiralty "V" Class—contd.													
Valhalla	C. Laird ..	1917											
Valentine	,, ...	1917											
Valkyrie	Denny	1917	312	29½	10⅝	2	1090	27,000	34	4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120	369
Valorous	,, ...	1917											
Vampire	J. S. White ..	1917											
Vimy (*late* Vancouver)	Beardmore ..	1918								4 4-in., 1 2-pr., 1 M., 4 L.	1 T. 1 D.		
Vanoc	Brown	1917	312	29½	10⅝	2	1090	27,000	34	4 4-in., 1 3-in. A.A., 1 M., 4 L.	2 T.		
Vanquisher ..	,, ...	1917											
Vectis	J. S. White ..	1917									2 T.		
Vega	Doxford ..	1917											
Velox	,, ..	1918									1 T.,		
Vendetta	Fairfield ..	1917								4 4-in.,			
Venetia	,, ..	1917	312	29½	10·7	2	1090	27,000	34	1 2-pr., 1 M., 4 L.	2 T.	120	370
Venturous	Denny	1917											
Verdun	Haw. Leslie ..	1917											
Versatile	,, ..	1918	..	..	..	..	..	..	..		1 T., 1 D.		
Vesper	Stephen ..	1918											
Viceroy (*T*) ..	Thornycroft ..	1918	312	30½	10¾	2	1120	30,000	35	4 4-in., 1 2-pr., 1 M., 4 L.	2 T.		
Viscount (*T*) ..	,, ..	1918											
Vimiera	Swan Hunter ..	1917	312	29½	10⅝	2	1090	27,000	34				
Violent	,, ,, ...	1917											
Vivacious	Yarrow ..	1917	312	29½	10⅝	2	1090	27,000	34		1 T. 1 D.		
Vortigern	J. S. White ..	1918											
Admiralty "R" Class;													
Tempest	Fairfield ..	1917	275½	26⅝	10⅝	2							
Tetrarch	H. & Wolff ..	1917	275¾	26⅝	10⅝	2							
Thisbe	Haw. Leslie ..	1917					900	27,000	36		2 D.	98	290½
Thruster	,, ..	1917	275½	26⅝	10⅝	2							
Tormentor	Stephen ..	1917	276½	26⅝	10⅝								
Torrid	Swan Hunter ..	1917	275½	26¾	10⅝								
Tyrant (*Y*) ..	Yarrow ..	1917	271½	25¾	9½	2	760	23,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	300 (*Y*) 256 (*T*) 285
Taurus (*T*)	Thornycroft ..	1917											
Teazer (*T*)	,, ..	1917	276¼	27	10½	2	905	29,000	35				
Skate	Brown	1917	276	26¾	10⅝								
Romola	Brown	1916											
Rowena	,, ...	1916	275½	26⅞	10⅝	2	900	27,000	36				
Restless	,, ...	1916											
Salmon	H. & Wolff ..	1916	275¾	26⅞	10⅝								
Admiralty Modified "R" Class:													
Umpire	Doxford ..	1917								3 4-in., 1 2-pr., 1 M., 4 L.			
Urchin	Palmer ..	1917	276	26¾	10⅝	2	915	27,000	36		2 D.	98	300
Ursula	Scott	1917											

1 Flotilla Leader and 8 Destroyers are authorised for commencement this year.

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Great Britain—*continued.*

SUBMARINES.

Name or Number.	Where Built.	Completed.	Dimensions. Length. (Extreme)	Beam.	Draught.	No. of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Parthian	Chatham ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Perseus	Vickers Armstrong ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Poseidon		Bldg.	..	..	..	..	..	..	..	..	..	..	..
Proteus		Aldg.	..	..	..	..	..	..	..	..	..	..	..
Pandora		Bldg.	..	..	..	..	..	..	..	..	..	..	..
Phœnix	Cammell Laird	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Odin ..	Chatham ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Olympus	Beardmore ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Orpheus	Beardmore ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Osiris ..	Vickers ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Oswald	Vickers ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Otus ..	Vickers ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Oberon	Chatham ..	1927	260	28	13·5	..	1,345 1 750 2 525	2700 1350	15	1 4-in.	..	..	200
X1 ..	Chatham ..	1925	363½	29·8	15·7	..	3 600	..	..	..	..	100	..
R4 ..	Chatham ..	1919	163	15·5	11·6	..	420 500	240 1,200	9½ 15	..	6	23	13
M3 (late K20)	Armstrong ..	1920	303	24·5	15·75	..	1,600 1,950	2,400 1,600	15½ 9½	4 L.	4	68	110
M2 (late K19)	Vickers ..	1920	296	24·5	15·75	..	1,600 1,950	2,400 1,600	15½ 9½	1 3-in., 2 Lewis	4	70	110
L71 ..	Scott's ..	1920								2 4-in., 1 Lewis			
L69 ..	Beardmore ..	1923											
L56 ..	Fairfield ..	1919	235	23·5	13·2	..	960 1,150	2,400 1,600	17½ 10½	1 4-in., 1 Lewis	6	44	110
L54 ..	Denny ..	1924											
L53 ..	Armstrong ..	1925								2 4-in., 1 Lewis			
L52 ..	Armstrong ..	1921											
L33 ..	Swan Hunter	1919											
L27 ..	Vickers ..	1926											
L26 ..	Vickers ..	1926											
L25 ..	Vickers ..	1920											
L23 ..	Vickers ..	1924								1 4-in., 1 Lewis	4	41	
L22 ..	Vickers ..	1921											
L21 ..	Vickers ..	1920											
L20 ..	Vickers ..	1919											
L19 ..	Vickers ..	1919	238½	23½	11·7	..	800 1,080	2,400 1,600	17½ 10½				76
L18 ..	Vickers ..	1919								1 Lewis, 16 mines	4	41	
L17 ..	Vickers ..	1918											
L16 ..	Fairfield ..	1918								1 4-in., 1 Lewis	4	41	
L15 ..	Fairfield ..	1918									4	41	
L14 ..	Vickers ..	1918								1 Lewis, 16 mines	4	41	
L12 ..	Vickers ..	1918								1 4-in., 1 Lewis	6	41	
L11 ..	Vickers ..	1918									6	41	
L8 ..	Cammell Laird	1918									4	41	
L7 ..	Cammell Laird	1917									4	41	
L5 ..	Swan Hunter	1918									4	41	
L4 ..	Vickers ..	1918									4	41	
L3 ..	Vickers ..	1918	231	23½	11·7	..	800 1,070	2,400 1,600	17½ 10½	1 4-in., 1 Lewis	4	41	76
L2 (late E58)	Vickers ..	1917									4	42	
L1 (late E57)	Vickers ..	1917									4	41	
K26 ..	Vickers ..	1923	351½	28	16·8	..	2,140 2,770	10,000 1,400	23½ 9	3 4-in., 2 Lewis	10	58	300
H50 ..	Beardmore ..	1920											
H49 ..	Beardmore ..	1919											
H48 ..	Beardmore ..	1919											
H47 ..	Beardmore ..	1919											
H44 ..	Armstrong ..	1920											
H43 ..	Armstrong ..	1919											
H34 ..	Cammell Laird	1919											
H33 ..	Cammell Laird	1919	171	15·75	13	..	440 500	480 320	13 10½	1 Lewis	4	23	16
H32 ..	Vickers ..	1919											
H31 ..	Vickers ..	1919											
H30 ..	Vickers ..	1918											
H28 ..	Vickers ..	1918											
H27 ..	Vickers ..	1918											
H24 ..	Vickers ..	1918											
H23 ..	Vickers ..	1918											

6 Submarines are authorised for commencement this year.

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Great Britain—*continued.*

SLOOPS.

NAME.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Coal. / Oil.	Complement.
SLOOPS.		ft. ins.	ft.ins.	ft. ins.									
Harebell	1290	274 9	35 0	12 0	2,500	Barclay Curle	Barclay Curle	1918	1918	2 *4-in.* 2 *12-pr.*, 2 L.	16·5	320 / —	115
Chrysanthemum	1290	276 0	35 0	13 3	2,500	Armstrong	Wallsend Slipway	1917	1918	2 *3-pr.*	16·5	260 / —	100
Bryony	1290	275 3	35 0	12 10	2,500	Armstrong	Wallsend Slipway	1917	1917	4 *3-pr.*, 1 M. 8 L.	16·5	260 / —	70
Heather	1250	277 9	33 6	11 10	2,500	Greenock & Grangemouth	Cooper & Greig	1916	1916	1 *4-in.*	16·5	260 / —	100
Cornflower	1250	267 9	33 6	12 10	2,000	Barclay Curle	Barclay Curle	1916	1916	2 *4-in.*, 4 *3-pr.* A.A., 2 M., 8 L.	16·5	255 / —	100
Crocus	1250	267 9	33 6	11 9	2,000	Lobnitz	Lobnitz	1915	1916	2 *4-in.*, 4 *3-pr.* A.A., 2 *2-pr.*, 8 L.	16·5	255 / —	100
Cyclamen								1915	1916				
Delphinium	1250	267 9	33 6	12 4	2,000	Napier & Miller	Dunsmuir & Jackson	1915	1916	2 *4-in.*, 4 *3-pr.* 1 *2-pr.*, 2 M., 8 L.	16·5	255 / —	118
Godetia	1250	267 9	33 6	12 0	2,000	C. Connell	Rowan	1916	1916	1 *4-in.*, 1 *12-pr.* 2 L.	16·5	255 / —	100
Lupin						Simons	Simons	1916	1916	2 *4-in.*, 4 *3-pr.*, 1 *2-pr.*, 8 L.		— / 182	
Rosemary						Richardson Duck	Blair	1915	1916	1 *4-in.*, 2 *2-pr.* 2 M., 8 L.		260 / —	
Snapdragon	1250	267 9	33 6	12 9	2,000	Ropner	Blair	1915	1916	2 *4-in.*, 4 *3-pr.* 2 *2-pr.*, 8 L.	16·5	255 / —	100
Verbena						Blyth Co.	Richardson's, Westgarth						
Wallflower						Irvines	Do,						
Wistaria						Do.	Do.						
Clematis	1200	262 6	33 0	12 3	1,800	Greenock & Grangemouth	Kincaid	1915	1915	2 *4-in.*, 4 *3-pr.* A.A., 2 M., 8 L. 1 *4-in.*, 2 *2-pr.*, 2 M., 8 L.	16·5	250 / —	100
Heliotrope						Lobnitz	Lobnitz						
Daffodil	1200	262 6	33 0	12 6	1,800	Scott's	Scott's	1915	1915	2 *4-in.*, 4 *3-pr.* 1 *2-pr.*, 2 M., 8 L.	16·5	250 / —	100
Bluebell										2 *4-in.*, 4 *3-pr.*, 2 *2-pr.*, 2 M., 8 L.			
Magnolia													
Laburnum						Connell	Rowan			2 *4-in.*, 4 *3-pr.* 2 *2-pr.*, 8 L.			
Veronica						Dunlop Bremner	Dunlop Bremner						
Dahlia										1 *4-in.*, 2 *2-pr.*, 2 M., 8 L.			
Foxglove										2 *4-in.*, 4 *3-pr.*, 2 *2-pr.*, 2 M., 8 L.			
Hollyhock													

The construction of 4 sloops is authorised for commencement this year.

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Great Britain—*continued.*

TWIN-SCREW MINESWEEPERS, RIVER GUNBOATS.

NAME.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Coal. / Oil.	Complement.
TWIN-SCREW MINE-SWEEPERS.													
Bridgewater	1000	266 4	34 0	8 6	2,000	Hawthorn Leslie	Hawthorn Leslie	1928	Bldg.	—	17	— / 275	100
Sandwich													
Aberdare						Ailsa	Ailsa	1918	1918	1 4-in., 1 12-pr. A.A.			
Abingdon						Ailsa	G. Clark	1918	1918				
Albury						Ailsa	Ailsa	1918	1919				
Alverford						Ailsa	W. H. Allen	1919	1919				
Bagshot						Ardrossan Dry Dock Co.	W. H. Allen	1918	1919				
Derby						Clyde S.B. Co.	Clyde S.B. Co.	1918	1918				
Dundalk						Do.	Do.						
Dunoon						Do.	Do.						
Fermoy						Dundee S.B. Co.	Cooper & Greig	1919	1919				
Fareham						Dunlop, Bremner	Dunlop, Bremner	1918	1918				
Forres						Clyde S.B.Co	G. Clark	1918	1919	—			
Tiverton						Simons	Simons	1918	1918				
Tralee						Do.	Do.						
Elgin						Do.	Do.						
Caterham						Bow, McLachlan	Bow, McLachlan	1919	1919			190 / —	
Carstairs						Do.	Do.			1 4-in., 1 12-pr. A.A.	16		75
Weybourne	800	231 0	28 7	9 0	2,200	Inglis	Inglis						
Sutton						McMillan	Yarrow						
Saltash						Murdock & Murray	Do.	1918	1918				
Saltburn						Do.	Do.						
Selkirk						Do.	D. Rowan	1918	1919				
Petersfield						Lobnitz	Lobnitz	1919	1919	1 4-in., 4 3-pr.			
Ross						Do.	Do.						
Widness						Napier & Miller	Rowan	1918	1918	1 4-in., 1 12-pr. A.A.			
Harrow						Eltringham	Wallsend Slipway						
Huntly						Do.	Eltringham						
Marazion						Fleming & Ferguson	Fleming & Ferguson	1919	1919	2 12-pr.			
Lydd						Fairfield	Fairfield	1918	1919				
Stoke						C. Rennoldson	Shields Eng. Co.	1918	1918	1 4-in., 1 12-pr. A.A.			
Pangbourne						Lobnitz	Lobnitz					140	
Tedworth						Simons	Simons	1917	1917	1 3-in. A.A.		—	35
RIVER GUN-BOATS.												—	
Gannet	310	185 0	29 0	4 0	2,250	Yarrow	Yarrow	1927	1928	2 3-in. A.A., 8 L.	16	60	60
Peterel								1927	1927			—	
Seamew	262	168 0	27 0	4 0	1,270	Do.	Do.	1928	1928		14	50	60
Tern								1927	1927				
Aphis						Ailsa	Ailsa	1915	1915	2 6-in., 1 3-in. A.A., 1 3-pr., 8 L.		— / 100	
Bee						Do.	Do.	1915	1916	1 6-in., 1 3-in. A.A., 2 3-pr., 1 3-pr., 8 L.			
Cicala						Barclay Curle	Barclay Curle	1915	1916	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.		35 / 55	
Cockchafer						Do.	Do.	1915	1916	2 6-in., 1 3-in. A.A., 8 L.			
Cricket						Do.	Do.	1915	1916	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.			
Gnat	645	237 6	36 0	4 6	2,000	Lobnitz	Lobnitz	1915	1915		14	— / 100	55
Ladybird						Do.	Do.	1915	1916	2 6-in., 1 3-in. AA., 1 2-pr., 8 L.		35 / 55	
Mantis						Sunderland S.B. Co.	N.E. Marine	1915	1915	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.			
Moth						Do.	Do.	1915	1916			— / 80	
Scarab						Wood, Skinner	Do.	1915	1915	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.		— / 105	
Tarantula						Do.	Do.	1915	1916			— / 105	
Teal													
Moorhen	180	165 0	24 6	2 3	670	Yarrow	Yarrow	1901	1901	2 6-pr., 8 L.	13	35	34
Widgeon								1904	1904			—	
Woodlark	150	148 6	24 0	2 0	550	Thornycroft	Thornycroft	1898	1898	2 6-pr., 8 L.	13	28	30

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Argentine Republic.

Name or Number.	Where Built.	Launched	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
FLOTILLA LEADERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Cervantes (ex Spanish Churruca) / Juan de Garay (ex Spanish Alcala Galiano)	Cartagena ..	1925	331½	31½	10½	2	1650	42,000	36	5 4·7 in., 1 3-in. A.A., 4 M.	2 triple	—	— / 540
Mendoza .. / La Rioja .. / Tucuman ..	J. S. White, Cowes	1928 Bldg. / Bldg.	335	31·8	9 2	2	1520	45,000	36·5	5 4·7 in., 1 3-in. A.A., 6 M.	2 triple	—	— / 700
DESTROYERS—													
Catamarca * .. .. / Jujuy †	Schichau .. / Germania ..	1911	288·7	27	8·6	2	950	18,000	32	3 4-in.	4	100	—
Cordoba * .. .. / La Plata †	Shichau .. / Germania ..	1910 / 1911	295	29·5	7·8	..	950	20,000	34·7 t.	3 4-in.	4	100	—
TORPEDO BOATS—													
Corrientes ‡ .. .. / Misiones ‡ .. .. / Entre Rios	Yarrow .. / Yarrow .. / Yarrow ..	1896 / 1896 / 1896	190	19·5	8·2	2	340	4,000	27·4 t. / 26·0 t. / 26·7 t.	1 3-in., 3 6-prs., and 2 1-pr.	3	66	80 / —
SUBMARINES—													
Santa Fe .. .. / Salta .. .. .. / Santiago del Estero	Tosi Taranto	Bldg.	221½	21½	13	2	850 / 1080	3,000	17·5 / 9	1 4·7	8	—	—

* Converted to oil-burning, 1927, at Buenos Aires. † Being converted to oil-burning at Buenos Aires.
‡ Paid off. 3 flotilla leaders and 3 submarines are projected.

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions. Length (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Para	Yarrow ..	1908	240 p.p.	23·6	10	2	560	7,014	27·25	2 4-in., 4 3 prs.	2	75	140 / —
Amazonas		1908						6,898	27·17				
Piahuy		1908						6,563	27·21				
Matto Grosso		1908						7,403	27·16				
Parahyba		1909						6,700	27·29				
Rio Grande do N. ..		1909						7,778	27·27				
Alagoas		1909						7,403	27·25				
Santa Catharina ..		1909						6,982	27·30				
Parana		1910						8,877	28·74				
Sergipe		1909						8,554	27·60				
Maranhao	Thornycroft ..	1913	265·3	26·5	10·2	..	934	22,500	31	3 4-in., 1 2-pr.	2 dble.	..	— / 250
TORPEDO BOATS—													
Goyaz	Yarrow ..	1907	152·5 p.p.	15·3	4·3	3	150	..	26·5	2–3 prs.	2	..	..
SUBMARINES—													
Humayta	Spezia (Ansaldo Fiat)	1927	282	25·6	15·2	2	1370 / 1850	4,800	18·5 / 10	1 4-in. A.A.	6	..	— / 140
F 1 .. .. / F 3 .. .. / F 5	Spezia (Fiat)	1913	150	13·6	12	..	250 / 370	800 / 500	13·5 / 8	..	2	..	..

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Chile.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Serrano	Thornycroft's	1928	300	29	9·3	2	1090	28,000	35	3 4·7-in, 1 3-in.	2 triple	130	— / 340
Orella													
Riquelme													
Hyatt													
Videla													
Aldea													
Almirante Lynch, Condell	White	Bldg. 1912 1913	320 p.p.	32·6	11·1	3	1850	30,000	31·7	6 4-in. 2 M.	4	190	427 / 80
Almirante Riveros (*ex*-Faulknor) ..	White ..	1914	320 p.p.	32·6	11	3	1700 to 1740	30,000	31·5	2 4·7-in., 2 4-in., 2 2-pdr. A.A.	4	174	403 / 83
Almirante Uribe (*ex*-Broke) ..													
Almirante Williams (*ex*-Botha)													
SUBMARINES—													
3 in No. (British "*O*" Class)	Vickers Armstrong's	Bldg.	..	..	..	..	..	..	..	..	..	..	..
H 1	Fore River, U.S.A.	1915	150·3	15·75	12·3	..	355 / 470	480 / 640	13 / 11	..	4	22	— / 17·5
H 2													
H 3													
H 4													
H 5													
H 6													

Denmark.

Name or Number.	Where built.	Launched.	Dimensions. Length. (Extreme).	Beam.	Draught.	Number of Screws.	Displacement.	Horse Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO BOATS. FIRST CLASS—													
B10. Havkatten	Royal Dockyard, Copenhagen	1919	126·3	13·9	9	2	108·5	2,000	24·6 *t.*	2 6-pr.	2	22	15 / —
B11. Sælen ..		1919											
B9. Nordkaperen		1918											
B8. Makrelen ..		1918											
B7. Narhvalen ..		1917											
B6. Havhesten ..		1917											
B5. Söhunden ..		1917											
B4. Sölöven ..		1916											
B3. Stören ..		1916											
B2. Springeren ..		1916											
B1. Ormen ..		1907	124·6	14	8·5	1	105	2,100	26	2 3-pr.	3	21	11 / —
E3. Sværdfisken	Burmeister, Copenhagen Yarrow & Co.	1913	148·2	16·9	7·5	2	190	3,480	26·2 *t.*	1 3-in.	4	30	28 / —
E2. Delfinen ..		1913											
E1. Hvalrossen ..		1913											
D3. Söülven ..		1911	181·7	18	9·7	2	275	5,000	27·5	2 3-in.	5	33	80 / —
D2. Flyvefisken		1911											
D1. Sörldderen ..		1911											
C3. Spaekhuggeren	Royal Dock., Copenhagen Schichau	1911	184·8	19·1	7·1	2	300	5,000	27·5	2 3-in.	5	34	80 / —
C2. Vindhunden													
C1. Tumleren ..													
TORPEDO BOATS. SECOND CLASS—													
A3. Sobjornen *	Royal Dockyard, Copenhagen	1898 recon. 1923	147	15·5	7·5	..	140	2,100	23	1 3-pr., 1 M.	4	25	15 / —
A2. Havornen * ..		1897 recon. 1923											
A1. Hajen * ..		1896 recon. 1923											
SUBMARINES—													
Daphne	Royal Dockyard, Copenhagen	1926	161	16	8·2	..	305 / 370	900 / 400	—	1 3-in. A.A.	6	18	— / 16
Dryaden													
Flora. C3 ..	Whitehead & Co., Fiume	1919	155·7	14·4	3·8	..	301 / 369	900 / 640	14·5 / 10·5	1 6-pr.	4 / 5	17	— / 13
Bellona. C2 ..		1919											
Rota. C1 ..		..											
B12. Galathea ..		..											
Neptun. B11 ..		..	133·3	12·3	8	..	181 / 231	450 / 340	13·5 / 9·8	1 6-pr.	3	12	— / 9
Triton. B10 ..		1914											
Ran. B9		1915											
Aegir. B8		1914											
Nymfen. A7 ..		1914	127·2	12	7·6	..	161 / 201	450 / 275	13·0 / 9·3	..	2	12	— / 8
Najaden. A6 ..		1913											
2 den April. A5 ..		1913											
Thetis. A4 * ..		1912											
Havfruen. A2 ..		1912											
Harmanden. A3 *		1911											

* In reserve.

3 torpedo boats, 315 tons, 6000 s.h.p., 28 knots, are authorised, and money has been voted for these.

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France.

Name or Number.	Where Built.	Launched.	Dimensions. Length (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
FLOTILLA LEADERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
D 4	Ch. de France, Dunkirk	Bldg.	..	..	..	..	2,400	..	37	5 5·5-in., 4 1-pr.	6	..	..
D 5	Ch. de la Mediterranée, Havre												
D 6	Ch. de la Loire, St. Nazaire												
D 7	Ch. de Bretagne, Nantes												
D 8	Lorient												
D 9													
Vauban	Ch. de Penhoet, St. Nazaire	Bldg.											
Valmy	Ch. de la Loire, St. Nazaire	1928	426½	..	..	..	2,646	70,000	36	6 5·5-in., 4 37 mm. A.A.	..	..	..
Verdun	Ch. de France Dunkirk	Bldg.											
Lion	Dunkirk ..	Bldg.											
Bison	Lorient ..	Bldg.	426·5	38·7	15	..	2,650	64,000	36	5 5·5 in., 4 1·5 in. A.A.	6	216	..
Guépard	Lorient ..	1918											
Chacal	St. Nazaire..	1924											
Jaguar	Lorient Dy.	1923											
Leopard	St. Nazaire..	1924											
Lynx	,,	1925	416	36	14·8	2	2,360	50,000	35·5	5 5·1-in., 2 3-in. A.A.	6	206	— / 530
Panthère	Lorient Dy.	1924											
Tigre	Nantes ..	1924											
Amiral Sénès, *ex* S. 113	Germany ..	1917	346·5	33·5	14·8	2	2,380	56,000 †	36·9 †	4 5·9-in., 4 M.	2 dbl.	160	— / 706
DESTROYERS—													
Forbin	Ch. de la Mediterranée	1928											
Frondeur	Ch. Navals Français, Caen	Bldg.											
Fougueux	Ch. de Bretagne, Nantes	1928	351·7	32·2	..	..	1,440	33,000	33	4 5·1-in., 1 3-in. A.A.	6	146	— / 300
Foudroant	Ch. de Dyle et Bacalon, Bordeaux	Bldg.											
Basque	Maritime ..	Bldg.											
Bordelais	Bordeaux ..	1928											
Boulonnais	Caen	1927	351·7	32·2	10·2	..	1,470	35,000	33	4 5·1 in., 1 3-in. A.A.	6	..	— / 300
Brestois	Nantes ..	1927											
L'Adroit	Dunkirk ..	1927											
L'Alcyon	Bordeaux ..												
Le Fortune	Caen												
Le Mars	Caen	1926	351·5	32·2	9·7	..	1,452	35,000	34	4 5·1 in., 1 3-in. A.A.	6	..	— / 295
La Palme	Nantes ..												
La Railleuse	Nantes ..												
Bourrasque	Dunkerque	1925											
Cyclone	Havre ..	1925											
Mistral													
Orage	Caen	1924											
Ouragon													
Simoun	St. Nazaire..	1924	346½	31·7	10·2	2	1,430	33,000	33·5	4 5·1-in., 1 3-in. A.A., 21·7-in. torpedo tubes.	6	140	— / 350
Sirocco	Rouen.. ..												
Tempête	Nantes ..	1925											
Tramontane	Bordeaux ..	1924											
Trombe	Harfleur ..												
Typhon	Bordeaux ..	1925											
Tornade	Barcelona ..	1925											
*Bouclier	Normand ..	1911	237·0	24·9	9·4	3	700	13,000	35·33	2 3·9-in., 1 3-in., 4 9-pr.	4	89	— / 140
Glaive..	Rochefort ..	1908	197·4	22·4	11·8	2	358	6,800	27·90	1 9-pr. 4 3-pr.	2	70	85 / —
Trident	Rochefort ..	1907	221·0	21·5	11·6	2	344	6,800	28	1 9-pr., 4 3-pr.	2	70	— / —
Com. Rivière, *Dehorter	Normand, &c.	1912	197·4	25·4	10·0	3	730	14,500	31	2 3·9-in., 4 9-prs.	4	84	— / —
*Bisson	Toulon, etc.	1912 & 1913	257·5	25·5	10·0	3	787–817	16,000	31	2 3·9-in., 4 9-prs.	2 dbl.	84	— / 140
*Protet, *Comm. Lucas, *Mangini													

* Fitted as mine-sweeper. † Fitted as mine-layer.

6 additional flotilla leaders of 2360 tons displacement are projected.

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France—*continued*.

Name or Number.	Where Built.	Launched.	Dimensions. Length (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes	Complement.	Fuel. Coal / Oil
DESTROYERS—*Contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Aspirant Herbert (2)	Rochefort ..	1911 & 1912	221	21·6	10·3	2	492	7,500	28·5	6 9-prs.	3	71	98–132 / —
Ens. Roux, M. P. Lestin	Rochefort ..	1915	271	27	10·5	2	925	17,000	30	2 3·9-in., 1 3-in., 4 9 pr.	2 dbl.	98	— / 206
Ens. Gabolde	Havre	1921	271	26·9	10·0	2	940	20,000	32·5	3 3·9-in. 1 3-in. A.A.	4	98	— / 200
Buino, *ex*-V. 136 ..	Germany ..	1917	269	27·2	10·0	2	1,053	25,000	34·7 *t*	3 4-in., 2 M., 24 mines.	6	113	— / 360
Rageot de la Touche, *ex* H. 146	Germany ..	1917	268	27·4	10·0	2	1,019	23,800	33·3 *t*	3 4-in., 1 1-pr., 4 M., 40 mines.	6	111	— / 295
Delage, *ex*-H. 147 ..	Germany ..												
Deligny, *ex*-S. 139 ..	Germany ..												
Chastang, *ex*-S. 133 ..	Germany ..	1917	272·3	27·3	11·5	2	984	24,000	33·7 *t*	3 4·1-in., 4 M.	6	113	— / 246
Vesco, *ex*-S. 134 ..	Germany ..												
Mazare, *ex*-S 135 ..	Germany ..												
P. Durand, *ex*-V. 79..	Germany ..	1915	269	28	10·0	2	1,053	23,000	30·2 *t*	3 4·1-in., 4 M., 24 mines.	6	114	— / 295
Matelot Leblanc, *ex* Dukla	Fiume ..	1916	277·5	25·7	11·0	2	940	17,000	32·5	2 3·9-in., 6 smaller.	4	120	168 / 152
Téméraire, Intrépide, Opiniâtre, Aventurier	Nantes ..	1911	290·5	28·5	11·5	..	1080	18,000	32	4 3·9-in. 1 3-pr. A.A.	4	102	236 / 74
Annamite, Algérien, Arabe, Bambara, Hova, Kabyle Marocain, Sakalave, Sénégalais, Somali, Tonkinois, Touareg ..	Japan	1917	272	24	10·5	..	770	10,060	29	1 4·7-in., 4 3-in.	2 dbl.	106	98 / 115

Seven 1st class torpedo boats (1905–7), 98 tons, 14-17 knots.

CRUISER SUBMARINES— Surcouf	Cherbourg ..	Bldg.	360	..	..	..	3300	..	18	..	..	..	..
SUBMARINES, 1st Cl.													
Q 153	Cherbourg ..	Bldg.	..	..	..	..	1536–1908	6000	18–10	..	..	..	..
Q 154	Ch. Navals Français, Caen												
Q 155	Forge et Ch. de la Mediterranée la Seyne												
Q 156	Ch. de la Loire, St. Nazaire												
157	Ch. Dubigeon, Nantes												
*Q 158	Toulon												
Achille	Brest	Bldg	302	26·8	15·5	..	1535–1968	6000	18–10	1 3·9-in., 1 1·5-in. A.A.	10	..	..
Arax	Ch. Dubigeon, Nantes												
Acheron	Ch. de la Loire, St. Nazaire												
Argo	Brest	1928	302·5	30·5	15·5	..	1535–1968	6000	18–10	1 3·9-in. 1 1·5-in. A.A.	10	..	..
Acteon		1928											
Pascal	Lorient ..	Bldg.											
Pasteur	Caen												
Poncelet	Ch. de Penhoet, St. Nazaire												
Henri Poincare ..	Ch. de la Mediterranée, la Seyne						4,760						
Archimede		Bldg.	216·5	23·3	13·5	..	747–910	(1300–1000)	12–9	1 3-in., 64 mines	4	..	..
Fresnel													
Monge													
*Nautilus	Toulon ..	1928											
*Saphir													
*Turquoise													
Redoubtable ..	Cherbourg ..	1928	302·5	30·5	15·5	2	1535–1968	6000	18–10	1 3·9-in. A.A. 1 1·5-in. A.A. 1 seaplane in Redoubtable	10	..	..
Vengeur		1924											
Requin		1925											
Morse		1925											
Narval		1924											
Souffleur		1927	278·8	22·5	15	2	1130–1415	(2900–1800)	16–10	1 3·9-in. A.A.	10	54	..
Caiman		1925											
Dauphin		1926											
Espadon	Toulon ..	1924											
Marsouin		1926											
Phoque	Brest												

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France—*continued.*

Number and Name.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surf./Sub.	Horse-Power.	Maximum Trial Speed. Surf./Sub.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
SUBMARINES—*Contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Amphithrite	Ch. de la Seine Maritime, Le Trait												
Antiope	Chantiers Normand, Havre												
Atalante	Schneider et Cie Chalons-sur-Saone	Bldg.	..	..	..	..	620	..	..	..	..	..	..
Amazone	Ch. de la Seine Maritime, Le Trait												
Diane	Chantiers Normand, Havre												
Meduse													
Argonaut	Schneider et Cie Chalons-sur-Saone	Bldg.	..	..	..	..	620	..	..	..	..	..	..
Arethuse													
Ariane		1925											
Ondine		1925											
Danaé	Havre	1927	216·5	16	12·8	2	600–766	1200–1000	14–9·5	1 3·9-in. A.A.	7	..	..
Eurydice		1927											
Circé		1925											
Calypso	Chalons ..	1926	204·5	17·5	12·8	2	590–765	1250–1000	14–9·5	1 3·9-in. A.A.	7	..	..
Doris		1927											
Thetis		1927											
Naïde		1925											
Sirène		1925											
Nymphe	St. Nazaire	1926	210	17	12 8	2	590–750	1300–1000	14–9·5	1 3·9-in. A.A.	7	39	..
Galatée		1925											
Amphitrite	Rochefort ..	1914											
Atalante	Toulon ..	1913	177	17·7	10·9	2	413–597	1300–700	14·7-8	1 3-in.	8	30	— / 13
Néréide	Cherbourg ..	1914	243	19·8	12·3	2	840–1070	2900–1500	14–12	2 3-in. ..	8	40	— / 56
Bellone, Hermione, Gorgone	Rochefort .. Toulon ..	1914 & 1915	198·9	17·7	11·9	2	562–783	1800–800	15·5–10	1–3-in. ..	8	29	— / 14
Gustave Zédé	Cherbourg ..	1913	243	19·7	12·3	..	840–1080	2400–1500	16–10	2 3-in. ..	8	47	— / 68
Daphne	Cherbourg ..	1915	223	18·0	12·0	2	703–882	1800–1500	15–11	1 3-in. ..	10	43	— / 58
Joessel, Fulton	Cherbourg ..	1917	243	20·0	13·4	2	915–1200	2900–1650	16½–11	2 3-in. ..	8	47	— / 118
Laplace	Rochefort ..	1917											
Lagrange	Toulon ..	1917	246	21·0	13·0	2	925–1307	2600–1640	17–11	2 3-in. ..	8	47	— / 90
Romazzotti, Regnault	Toulon ..	1918											
Amazone, Armide ..	Schneider ..	1916	184·6	17·0	10·6	2	451–665	2000–900	15–10	1 1-pr. ..	4	29	— / 27
O'Bryne, Henry Fournier,	Chalons ..	1919	172	15·6	9·6	..	335–502	1020–460	14–8	1 3-pr. ..	4	24	— / 10
Dupuy de Lôme, Sané	Chalons ..	1916 1915	246	20·9	13·7	..	837-1270	2400–1660	18–11	2 3-in. ..	8	40	— / 99
*Pierre Chailley	Havre	1922	229·7	24·7	13 0	..	886–1181	1800–1400	13·5–9	1 3·9-in., 2 M 40 mines	4	43	— / 54
*Maurice Callot	Bordeaux ..	1921	247·8	22	11·8	..	920–1270	2900–1640	16½–10	1 3-in., 40 mines	6	48	— / 44
Pierre Marrast (*ex*-U. 162)													
Jean Roulier (*ex*-U. 166)	,, ..	1918	235	21	12·7	2	860-1030	2400–1200	16–8·5	1 4-in., 1 M.	6	48	— / 98
Halbronn (*ex*-U. 139)	,, ..	1918	302·2	30	15·5	2	2030–2516	3300–1780	13·6–7·7	1 M.	6	80	— / 443
Jean Autric (*ex*-U. 105)													
Leon Mignot (*ex*-U. 108)	,, ..	1917	234·5	21	12·5	..	835–1038	2400–1200	16·5–8·5	1 4·1-in., 1 M.	6	48	— / 81
Jean Corre (*ex*-U.B. 155)													
Carissan (*ex*-U B. 99)	,, ..	1917	182·5	19	12	..	520–640	1100–760	12–7·5	1 4·1-in., 1 M.	5	34	— / 74
Trinité Schillemans (*ex*-U.B. 94)		1918											
*René Audry .. .. (*ex*-U. 119)	,, ..	1917	267·5	24	14	..	1181–1525	2400–1200	14·5–7·2	1 5·9-in., 1 M. 42 mines	4	54	— / 213
*Victor Réveille .. (*ex*-U. 79)	,, ..	1916	193	19·5	16	..	797–877	1300–800	10–8	1 4·1-in., 1 M. 36 mines	2	40	— / 64

French submarines are now divided into two classes:—1st class: All vessels of 850 tons and above in the surface condition, including the U mine-layers. 2nd class: All smaller vessels.

6 1st class submarines are projected for commencement in 1928 and 5 more for 1929, but no money has been voted.

1 cruiser submarine is projected for commencement 1928-29, but no money has been voted.

4 2nd class submarines, A, B, C, D, are authorised for commencement in 1928, and money voted. These will be 620 tons surface displacement.

2 mine-laying submarines are projected in a programme 1928–29.

* Mine-laying submarines.

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Germany.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS—			Feet.	Feet.	Feet		Tons.		Knots.				Tons.
W 109. Iltis	Wilhelmshaven	1937	304	28½	8¾	..	800	23,000	34	3 4·1-in.	6	..	..
W 110. Wolf		1927											
W 111. Tiger													
W 112. Luchs ..		1928											
W 113. Jaguar ..													
W 114. Leopard ..													
W 103. Seeadler ..	Wilhelmshaven	1926	287¾	27½	10	..	787	23,000	32	3 4·1-in.	6	115	— / 300
Greif		1926											
W 105. Albatross ..		1926											
W 106. Kondor ..		1926											
W 107. Falke ..		1926											
Möwe	Wilhelmsh'n	1926	295·5	27½	9·2	..	785	23,000	32	3 4·1-in.	6	115	— / 300
S. 23	Shichau Elbing	1913	234·6	24·6	10		620	15,000	32·5	24·1-in., 7 M.	2	90	132 / 55
S. 19		1912								24·1-in., 2 M.			
S. 18		1912								24·1-in., 7 M.			
G. 11	Germania Works, Kiel	1911	233	25	10		650	15,000	32·5				
G. 10													
G. 8													
G. 7		1912											
V. 6	Vulcan Works, Stettin	1913	233	25	10		660	15,000	32·5	24·1-in., 7 M.	2	90	140 / 60
V. 5		1913											
V. 3		1911											
V. 2		1911											
V. 1		1911											
T. 196	Kiel	1911	243	26	10·5		787	16,000	32·5	24·1-in., 7 M.	2	98	160 / 54
T. 190	Vulcan Works, Stettin	1910					787	16,000	32·5	24·1-in., 2 M.	2	98	160 / 54
T. 185			242·5	26	10·5		718	16,000	32·5	24·1-in., 2 M.	2	98	148 / 40

11 torpedo boats (1907–8), 650–664 tons, 30 knots, 5 have 1 twin torpedo tube and 6 have 3 torpedo tubes; 7 carry 2 22-prs., 7 M., and the remaining 4 carry 1 22-pr., 1 M.

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Thyella	Yarrow ..	1906	220	20·6	9·0	2	350	6000	31·79 / 31·84 / 32·53	2 3-in., 4 6-pr.	2	70	80 / —
Sphendoni													
Lonchi													
Smyrne (*ex*-Austrian Ulan)	Trieste	1907	220	20·3	8·0	2	400	6000	28	2 11-pr., 2 11-pr., A.A.	2	86	90 / —
Niki	Stettin (Vulcan)	1906	220	20·6	9·0	2	350	6000	30	2 3-in., 4 6-pr., 2 6-pr. A.A.	2	70	80 / —
Aspis													
Velos													
†Aetos, †Leon, †Panther, †Ierax ..	Birkenhead	1911	293	27·7	9·6	..	980	19,750	32	4 4-in., 3-in. A.A.	6	110	— / 260
SUBMARINES—							Surf. / Sub.		Surf. / Sub.				
Katsonis	Schneiders, Harfleur	1926	203¾	17·7	12·3	..	593 / 760	1300 / 1000	14 / 9·5	1 4-in., 1 2-pr. A.A.	6	30	..
Papanicolis	Ch. de la Loire, Nantes												
Nereus	Ch. de la Loire, Nantes	1927	223¾	18¾	12·6	2	718 / 945	1970 / 1200	14 / 9·5	1 4-in., 1 2-pr. A.A.	8	45	..
Proteus		1927											
Triton		1928											
Glaucos	Ch. de France, Caen	1928											

Six 125-ton torpedo-boats built by the Vulcan Co. at Stettin: Arethusa, Doris, Aigli, Dafni, Alkyonis, Thetis, 25 knots.
The surrendered Austrian torpedo-boats: Pergamos, Kios, Proussa, Kyzikos and Kydonia, 250 tons, have been added to the Greek Navy for police duties.
† Reconstructed by Messrs. J. S. White & Co., Cowes, 1924–25.

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Italy.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Standard Displacement. (Wash. Treaty.)	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
FLOTILLA LEADERS—			Feet.	Feet.	Feet.		Tons		Knots				Tons.
Dardo Strale Freccia Saetta	Odero, Sestri Pozente Cant. Navale di Tirreno, Sestri Levante	Bldg.	..	..	..	..	1334	..	38	..	..	..	..
U. Vivaldi A. Usodimare L. Tarigo L. Malocello L. Pancaldo A. Da Noli E. Pessagno N. Da Recco N. Zeno G. Da Verazzano A. Cadamosto A. Pigafetta	Genoa (Odero) Genoa (Ansaldo) Riva Trigoso (Cant. Navali) Ancona (Cant. Navali) Fiume	Bldg.	..	..	..	..	1978	50,000	38	6 4·7-in. 3 2-pr.	6	..	..
Leone* Pantera* Tigere*	Ansaldo	1923 1924 1924	359·3 p.p.	34·3	11·5	..	1525	42,000	34	8 4·7-in. twins, 2 3-in. A.A., 60 mines.	2 triple	210	— / 350
Aquila*	Pattison	1916	310	31	10·8	..	1407	40,000	35	4 4·7-in. twins, 2 3-in. A.A., 50 mines	2 dbl. 18-in.	140	— / 260
Falco*	Pattison	1916	310	31	10·8	..	1407	40,000	35	5 4·7 in. (2 twins and 1 single), 4 3-in. A.A., 50 mines.	2 dbl. 18-in.	140	— / 260
Premuda* (*ex*-German V116)	..	1918	347·8	34	14·2	..	2165	54,000	33	4 5·9 in., 2 2-pr A.A.	2 dbl. 19·7in	..	— / 720
Augusto Riboty* Carlo Mirabello*	Ansaldo	1915 1914	331·3 p.p.	32·2	9·8	..	1285 1382	35,000	35	8 4-in., 4 2-pr. A.A., 100 mines.	2 dbl. 18-in.	150	— / 344
Cesare Rossarol,* *ex*-German B97	Hamburg	1915	321½	30·6	9 5	2	744	40,000	36	3 4·7-in., 2 3-in. A.A. 24 mines	4	..	— / 526
DESTROYERS—													
Borea	Ansaldo, Genoa	1927											
Zeffiro		1927											
Espiro		1927											
Ostro		1928	311½	30·2	10·6	2	1092	35,000	36	4 4·7-in., 3 2-pr. A.A. 3 M., 52 mines	6	140	— / 340
Aquilone	Odero, Genoa	1927											
Turbine		1927											
Nembo	Genoa	1927											
Euro	Docks Co.	1927											
N. Sauro	Odero	1926											
C. Battisti	Quanaro, Fiume	1926	295½	30·2	10·5	..	1060	32,000	35	4 4·7-in., 3 2-pr. A.A. 3 M., 52 mines	6	140	— / 340
F. Nullo		1925											
D. Manin		1925											
Francesco Crispi	Naples (Pattison)	1925											
Giovanni Nicotera		1926	278·6	28·2	10	2	935	28,000	35	3 4·7-in., 1 2-pr. A.A. 2 M., 40 mines	2 dbl. 2 1-in.	106	— / 200
Bettino Ricasoli		1926											
Quintino Sella		1925											
Alessandro Poerio	Genoa (Ansaldo)	1914	279	26·3	9·3	2	844	20,000	32	5 4-in., 2 2-pr. A.A.	2 dbl.	100	— / 250
Gulielmo Pepe													
Ascaro	Genoa (Ansaldo)	1912	213·5	20·0	7·0	2	330	6,000	28·5	4 3-in., 1 smaller	3	55	— / 82
Pontiere		1916											
Fuciliere		1909											
Impavido	Naples (Pattison)	1913	239½	24·0	8·4	2	540	13,500	30	5 4-in., 2 2-pr. A.A. 1 M., 10 mines	2	71	— / 110
Indomito		1912											
Insidioso		1913											
Irriquieto		1913											
Ardito	Orlando (Leghorn)	1912	239½	24·0	8·4	2	560	13,800	30	5 4-in., 2 2-pr. A.A. 10 mines	2	71	— / 110
Ardente													
Giuseppe Sirtori	Genoa (Odero)	1916	237¾	24	9·0	2	670	15,000	30	6 4-in., 4 2-pr. A.A. 2 M.	4	100	— / 150
Vicenzo Orsini		1917											
Francesco Stocco		1916											
Giovanni Acerbi		1916											
E. Cosenz	Genoa (Odero)	1918	237¾	24	9·0	2	635	15,000	30	4 4-in., 2 3-in., 2 M. Carries 10 mines.	4	100	— / 150
Giacomo Medici		1917											
G. La Farina		1918											
Nicola Fabrizi		1917											
Angelo Bassini		1917											
Giacinto Carini		1917											
G. La Masa		1917											
Fratelli Cairoli	Naples (Pattison)	1914	236	24	8·8	2	615	18,000	30·8 30	5 4-in., 4 2-pr. A.A. 2 M.	4	71	— / 150
Antonio Mosto													
Rosolino Pilo													
Giuseppe Abba	Genoa (Odero)												
Ippolito Nievo													
Simone Schiaffino													
Giuseppe Dezza													
Giuseppe Missori		1915											

* Designated scouts in Italian official list of naval vessels.

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Italy—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length (Extreme)	Beam.	Draught.	Number of Screws.	Standard Displacement. (Wash. Treaty.)	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—*contd.*													
Gen. A. Cantore .. Gen. A. Chinotto .. Gen. A. Papa .. Gen. A. Cascino .. Gen. M. Prestinari Gen. C. Montanari	Genoa (Odero)	1921 1922	240½	24	9·0	2	635	15,500	30	3 4-in., 2 3-in. A.A.	4	100	— / 150
Audace	Yarrow ..	1918	287	27·5	8·3	2	630	21,500	30	7 4-in., 1 2-pr. A.A.. 2 M.	2 dbl.	111	— / 252
Ardimentoso, *ex*-S. 63	Schichau ..	1915	274	27·3	8·6	2	803	23,000	30	3 3·9-in., 2 3-in., 24 mines	4	98	— / 305
Solferino, Palestro S. Martino, Curtatone Confienza, Castelfidardo, Calatafimi, Monzambano ..	Leghorn (Orlando)	1921 1922 1923	269 283½	26·5	8·6	2	860 966	18,000	32	4 4-in., 2 3-in. A.A., 2 M., 24 mines	4 6	..	— / 170
Cortellazzo .. . Grado .. .. .. Monfalcone .. .. Muggia .. .. .. Pola	Danubius *ex*-Austrian	1917 1912 1913	274	25·5	8·2	2	570	17,000	32·5	2 3·9-in. 4 3-in. 2 3-in. A.A. 2 M.	4	102	— / 95
FIRST CLASS TORPEDO BOATS—													
Calipso	Naples (Pattison)	1908	164·3	17·4	7	2	160	2,950	25	2 3-in. A.A., 1 M.	2	35	— / 30
P.N., 2, 3, 7, 9, 12, 33, 34, 35, 38, 41–45, 64, 65, 67, 69–71	Pattison ..	1912 & 1913	139·5	15	5·5	2	116 133	2,700–3,500	28–29	2 3-in. A.A. 1 smaller	2	..	— / 15
A.S., 26–29, 52–57 ..	Ansaldo ..												
O.S., 15–16, 19, 46–51	Odero	1914											
O.L., 58–63	Orlando ..	1916	139·5	15	5·5	2	133	2,700–3,800	27	2 3-in. A.A. 1 smaller	2	..	— / 25
O.L.T., 74, 75 ..	Orlando ..	1920					168						
SUBMARINES—													—
Santorre Santarosa Ciro Menotti .. .. Fratelli Bandiera .. Luciano Manara .. Luigi Settembrini .. Ruggiero Settimo ..	Ansaldo .. Monfalcone Taranto ..	Bldg.	..	..	..	..	830 1040	3,000 1,400	17·5 9	1 4-in.	8	..	..
E. Fieramosca ..	Taranto (Tosi)	..	..	..	..	..	1300 1707	5,500 2,000	19 10	1 4·7-in., carries mines	6	..	— / 80
M. Bragadino .. F. Corridoni	Taranto (Tosi)	..	..	..	..	..	768 1021	1,500 1,500	14 8	1 4-in., carries mines	4	..	— / 41
Ballila .. .. .. A. Sciesa .. .. .. E. Toti .. .. .. D. Millelire	Spezia, Ansaldo	1927 Bldg. 1927	285	25·6	14	..	1300 1854	4,800 2,200	18·5 10	1 4·7-in., 1 smaller	6 21-in.	..	— / 69
V. Pisani .. .. .. M. Colonna .. .. Da. Geneys .. .. G. Bausan	Montfalcone, Trieste	1927 1927 1928	223	18·7	13·8	..	768 1034	3000 1000	17·5 9	1 4-in. 1 M.	6 21-in.	..	— / 48
G. Mameli .. .. P. Capponi .. .. Speri .. .. G. Da. Procida ..	Taranto ..	1928 1926 1927 1928	213·3	21·5	13	..	718 977	3000 1000	17·5 9	1 4-in.	6 21-in.	..	— / 48
L. Galvani, E. Torricelli, P. Micca ..	Spezia	1918 1917	211·7	20·3	15·6	..	780 1224	2,600 1,300	17 10	2 3-in., 1 M.	6 18-in.	32	— / 50
L. Mocenigo .. .. A. Emo	Venice	1918 1919											
G. Nani	Spezia, F.I.A.T.	1917	218·0	19·3	14	..	708 909	2600 1300	17 10	2 3-in., 1 M.	6 18-in.	32	— / 60
X* 2, 3	Ansaldo ..	1916	139·9	18	11	..	390 460	650 320	10 6·3	1 3 in. A.A. 1 M., 18 mines	2 18-in.	..	— / 8
H* 1 to 4, 6 to 8 ..	Vickers ..	1917	150·3	15·8	12	..	336 466	500 300	12 8·9	1 3-in. A.A. 1 M.	4 18-in.	22	— / 18
F* 1, 2, 5, 6, 7, 10, 12, 13, 14, 15, 17, 18, 19, 20, 21	F.I.A.T. .. Odero and Orlando ..	1916	149·6	13·8	10	..	242 313	700 250	14 8	1 3-in. A.A. 1 smaller,	2 17·7 in.	22	— / 12
N 1, N 3, N 4 .. .. N 5, N 6	Ansaldo .. Taranto ..	1916 1917	150·5	14	9·9	..	262 357	650 320	12·5 7·5	1 3-in. A.A. 1 M.	2 18-in.	21	— / 9

4 submarines projected to be commenced 1928–29, but no money has been voted.

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Japan.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS :			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
Shikinami	Maizuru ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
No. 45. Ayanami ..	Fujinagata..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
No. 35. Fubuki ..	Maizuru ..	1927	320	30	9·6	..	1700	..	34	6 4·7-in., 2 M.	9	..	..
36. Shirayuki ..	Sasebo ..	Bldg.											
37. Hatsuyuki ..	Maizuru ..	Bldg.											
38. Miyuki	—	Bldg.											
39. Murakumo ..	—	Bldg.											
40. Shinonome ..	Sasebo.. ..	—											
41. Usugumo	Ishikawa-jima (Tokyo)	1927											
42. Shirakumo ..	Fujinagata..	1927											
43. Isonami ..	Uraga	1927											
44. Uranami ..	—	—											
28. Minadzuki ..	Uraga	1926	320	30	9·8	2	1450	38,500	34	4 4·7-in., 2 M.	8	148	— / 400
29. Fumitsuki ..	Fujinagata..	1926											
30. Nagatsuki ..	Ishikawa-jima	1926											
31. Kikudzuki ..	Maizuru ..	1926											
32. Mikadzuki ..	Sasebo.. ..	1927											
33. Mochidzuki ..	Uraga ..	1927											
34. Yudzuki ..	Fujinagata	1927											
11. Oite ..	Uraga	1924, 25	320 p.p.	30	9·6	..	1450	38,500	34	4 4·7-in., 2 M. A.A.	8	148	— / 400
23. Yayoi ..													
13. Hayate ..	Ishikawa-jima	1925											
25. Udzuki ..													
17. Yunagi ..	Sasebo.. ..	1924, 25											
19. Mutsuki													
21. Kisaragi ..	Maizura ..	1925											
27. Satsuki	Fujinagata..	1925											
1. Kamikaze	Nagasaki ..	1922	320 p.p.	30	9·6	..	1450	38,500	34	4 4·7-in., 2 M. A.A.	8	..	— / 400
3. Asakaze													
5. Harakaze													
7. Matsukaze	Maidzura ..	1922–24											
9. Hatakaze													
15. Asanagi ..	Fujinagata..	1924											
Umikaze, Yamakase	Maizuru and Mitsubishi ..	1910–11	323·3	28·0	9·2	3	1150	20,500	33	2 4·7-in., 5 12-pr.	4	139	250 / 178
Amatsukaze	Kiobe	1916	325·5	28·0	9·3	3	1227	27,000	34	4 4·7-in., 2 M. A.A.	6	145	145 / 295
Tokitsukaze	Kure												
Isokaze	Kure												
Hamakaze	Nagasaki ..												
Tanikaze	Maizuru ..		336·5	29	9·3	2	1300	34,000	34	3 4·7-in., 2 M.	6	128	— / 380
Kawakase	Yokosuka ..												
Sawakase..	Nagasaki ..	1916–19	336·5	29·25	9·5	2	1345	38,500	34	4 4·7-in. 2 M. A.A.	6	149	— / 400
Okikase, Shimakase, Nadakase, Yakase, Hakase, Minekase	Maidzuru ..												
Namikase, Numakase, Nokase, Tashikase, Shiokase, Hokase, Yukase, Akikase	Mitsubishi, Kawasaki, Maidzuru	1920–2											
SECOND CLASS—													
No. 2. Wakatake	Kawasaki, Kobe	1922	275 p.p.	26·5	8·3	..	900	21,000	31·5	3 4·7-in., 2 M. A.A.	4	110	— / 250
4. Kuretake													
16. Fuyo ..	Fujinagata..	1922, 23											
18. Karukaya													
10. Asagao ..	Ishikawa-jima	1922–23											
12. Yugao ..													
6. Sanaye ..	Uraga	1923											
8. Sawarabi													
Sakura, Tachibana..	Maizura ..	1911–12	274	24·0	7·9	3	600	9,500	30	1 4·7-in. 4 3-in.	4	92	126 / 32
Kaba	Yokosuka ..	1915	274·0	24·0	8·5	2	665	9,500	30	1 4·7 in. 4 3-in.	4	92	90 / 135
Kaede	Maizuru ..												
Kashiwa	Nagasaki ..												
Katsura	Kure												
Kiri	Uraga												
Kusunoki	Kobe												
Matsu	Nagasaki ..												
Sakaki	Sasebo.. ..												
Sugi	Osaka.. ..												
Ume	Kure												
Momo, Yanagi ..	Sasebo.. ..												
Kashi, Hinoki ..	Maidzuru ..												
Nara..	Yokosuka ..												
Kuwa, Tsubaki ..	Kure	1916–18	275·0 p.p.	25·3	7·9	2	835	16,000	31·5	3 4·7 in., 2 M.	6	109	92 / 212
Maki, Keyaki	Sasebo.. ..												
Enoki	Maizuru ..												

Six 3rd class destroyers of 375 tons, 6,000 shaft h.p., and 30 knots, carrying 6 12-prs. and 2 T.T., fitted as minesweepers.
Thirteen 1st class destroyers, of 1700 tons, projected for building during 1928-31; money has been voted for 4 of these.

Japan—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length (extreme).	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Coal / Oil
DESTROYERS—*contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tns.
Second class—contd.													
Momi, Kaya	Yokosuka ..												
Nashi, Kaki, Take	Kawasaki ..												
Kuri	Kure	1917–19	275·5 p.p.	26	8	2	850	21,000	31·5	3 4·7 in., 2 M.	4	110	— / 250
Nire, Tsuga	Ishikawa-jima												
Urakaze	Yarrow ..	1915	287·3	27·6	9·5	2	955	22,000	28	1 4·7-in., 4 3-in.	4	117	— / 248
Hagi	Uraga												
Susuki, Yomogi	Ishikawa-jima												
Sumire													
Hishi, Hasu	Uraga,	1920–1922	275·5 p.p.	26	8	2	850	21,000	31·5	3 4·7 in. 2 M., A.A.	4	110	— / 250
Tade, Fuji	Fujinagata,												
Aoi, Kiku ..	Kawasaki												
Tsuta, Ashi, ..													
SUBMARINES—		Completed					Surf. / Sub.						
I59	Yokosuka ..						1700	..	..	..	..	..	..
I61	Mitsubishi ..	Bldg.	..	..	..	..	2000						
I62, I64, I57	..												
I4	Kawasaki ..	Bldg.	320	29·6	17·5	..	1970	6800	17·5	2 4·7 in. 1 M.	6	..	— / 400
I1, I2, I3	Kawasaki ..	1926					—	1800					
†I21	..	1927											
†I22		1928					1000						
†I23	Kawasaki ..	1928	..	..	..	..	—	..	..	1 4·7-in.	4	..	..
†I24		Bldg.											
I53	Kure	1926											
I55	Kure	1927					1700	6000	21				
I56	Kure	Bldg.	..	..	..	..	2000	1800	7·9	1 4·7-in.	8	..	— / 255
I54, I63, I60	Sasebo ..	Bldg.											
I58	Yokusuka ..	1928											
							770	2600	17				
Ro. 31	Mitsubishi ..	1927	243½	20	..	..	1000	1200	10	1 4-in.	4	43	— / 75
Ro. 65	Mitsubishi ..	1926					1000	2400	17				
Ro. 66	Mitsubishi ..	1927	..	..	..	..	1500	1800	10	1 3-in.	6	..	— / 75
Ro. 67	Mitsubishi ..	1927											
							1500	6000	21				
I. 51, 52	Kure	1924	330	..	..	..	—	—	7·9	1 4·7-in.	6	..	— / 190
Ro. 68, 64	Mitsubishi ..	1925											
Ro. 63, 62, 61	Mitsubishi ..	1924	250	24.2	12·4	..	1000	2400	17	1 3-in.	6	47	— / 75
Ro. 60	Mitsubishi ..	1923					1500	1800	10				
Ro. 32, 30	Kawasaki ..	1924	243·5	20	..	..	770	2600	17	1 4-in.	4	43	— / 75
Ro. 29	Kawasaki ..	1923					1000	1200	10				
Ro. 28	Sasebo ..	1923									4		
Ro. 27	Yokosuka ..	1924	230 p.p.	20·1	12	..	750	2600	17	1 3-in. 1 3-pr.	21-in.	..	— / 75
Ro. 26	Sasabo ..	1922					1000	1200	10				
Ro. 59	..	1923	231·5	23·5	13	..	900	2400	17	1 3-in.	4	65	— / 76
Ro. 58, 57	..	1922					1082	1600	10·5	1 3-pr.	21-in.		
Ro. 25, 19, 18, 17 ..	Sasebo, Kure	1921											
Ro. 24	Sasebo ..	1920											
Ro. 23	Yokosuka ..	1923	230	..	..	..	740	2600	17	1 3-in.	6	43	— / 75
22, 21, 20, 16 ..	Yokosuka, Kure	1922					990	1200	10	1 3-pr.	18-in.		
							750	2600	17	1 3-in.	5		
Ro. 3, 4, 5	Kawasaki ..	1922	215·2	20	13·5	..	950	1200	10	1 3-pr.	18-in.	..	— / 60
Ro. 56, 55	Mitsubishi ..	1922					900	2400	17	1 3-in.	6		
54, 53	Mitsubishi ..	1921	231·5	23·5	13	..	1082	1600	10·5	1 3-pr.	18-in.	65	— / 76
52, 51	Mitsubishi ..	1920											
Ro. 15, 14	Kure	1921	220 p.p.	20	12·3	..	740	2600	17	1 3-in.	6	48	..
13	Kure	1920					986	1200	10	1 3-pr.	18-in.		
							720	2600	17	1 3-in.	6		
Ro. 12, 11	Kure	1919	220 p.p.	21	11·3	..	1035	1200	10	1 3-pr.	18-in.	..	— / 60
							700	2600	17	1 3-in.	5		
Ro. 1, 2	Kawasaki ..	1920	215·2	20	13·5	..	1072	1200	10	1 3-pr.	18-in.	..	— / 65
Ha. 9	Kure	1920	186 p.p.	17	10·3	..	480 / 685	1800	16	1 3-pr.	6 18-in.	..	..
Ha. 10	France ..	1917	184 5 p.p.	17	10·3	..	460 / 655	850	10				
							290	600	13		4		— / 10
Ha. 7, 8	Kure	1916	134·8 p.p.	13·5	12·2	..	320	300	8	—	18-in.	..	
							300	1000	11				
Ha. 6	Kure	1912	125	12·7	12	..	330	300	7	—	2	..	— / 10
							290	600	12·75				
Ha. 3, 4, 5	Kure	1911	134·8 p.p.	13·5	12	..	320	300	7·75	—	2	..	— / 13
							285	600	12·9				
Ha. 1, 2	Vickers ..	1908	134·8 p.p.	13·5	13	..	315	300	7·8	—	2	..	— / 13

Four submarines are projected for building 1928 to 1931, I5, I65, I66, I67.
† Fitted for mine-laying.

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Netherlands.

Name or Number.	Where built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-power.	Maximum speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal. / Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
*Banckert ..	Burgerhout	Bldg.											
*Van Nes ..	Rotterdam	Bldg.											
*Van Galen	Fijenoord	1928	—	—	—	—	1650	31,000	—				
*Witte de With	Rotterdam	Bldg.											
*De Ruyter	Flushing	1926											
*Evertsen ..	Rotterdam	1926	321·5	31	9·8	..	1620	31,000	34	4 4·7-in. / 2 3-in. A.A. / 24 mines	6 21-in.	126	— / 330
*Piet Hein ..		1927											
*Kortenaer		1927											
*Jakhals,	Flushing	1910–1913	230	22	9	2	510	8,500	30	4 3-in., 4 M.	2	84	103 / 11
*Lynx, *Panter,* Vos	Rotterdam												
1ST CLASS TORPEDO BOATS—													
*Zeeslang,	Flushing	1907	130	13·8	6·9	1	104	1200–1560	24	2 1-prs.	2	20	20 / —
*Krokodil,		1906											
*Draak,		1906											
G 13 15-16	Scheldt / Fijenoord	1913–1914	162·5	17·3	9·0	..	180	2,600	26	2 3-in.	3	25	40 / —
Z 1-4 ..	Amsterdam	1916–1917	201	20·4	6	2	322	5,500	27	2 3-in., 2 M	4	39	61 / 8
Z 5-8 ..	Scheldt / Fijenoord	1915	192	19·8	5·5	2	310	5,500	27	2 3-in., 2 M.	4	39	70 / 7
SUBMARINES—							Surf. / Sub.						
O 12 ..	De Schelde	Bldg.	..	..	..	..	560 / 700	..	14 / 8	2 1·5-in. A.A.	5	..	..
O 10 ..	Amsterdam	1925	179½	18·7	11½	..	506 / 627	900 / —	12¾ / 9	1 22-pr. A.A. 1 maxim	5	29	— / 21
*K 13 ..	Fijenoord	1924	218·8	20·2	12·2	..	660 / 810	2,400 / —	15 / 8	1 22-pr., 1 maxim	6	31	— / 45
*K 12 ..													
*K 11 ..													
O 11.. ..	Fijenoord	1925	179½	18·7	11½	..	506 / 627	900 / —	12¾ / 9	1 22-pr. A.A., 1 maxim	5	29	— / 21
O 9	Flushing	1925											
O 8 (*ex*-British H6)	..	1914	150·3	15·8	12·3	..	364 / 434	480 / 320	13 / 8·5	1 maxim	4	26	— / 18
M1 (*ex*-German UC 8)	Hamburg	1915	111½	10·3	9	..	157 / 176	80 / 155	7½ / 5	1 4-pr. 12 mines	—	16	— / 2½
O 7	Fijenoord	1916	112	12·8	9·5	..	177 / 206	350 / 185	11·5 / 8·5	1 maxim	3	12	— / 5·4
O 6	De Schelde	1916	115·9	12·8	9·5	..	187 / 226	350 / 185	11·5 / 8·5				
O 5	De Schelde	1913	105·3	10·2	9·5	..	129 / 147	300 / 170	11 / 8·5	1 maxim	2	10	— / 3·6
O 4	De Schelde	1913											
O 3	De Schelde	1912											
O 2	De Schelde	1911											
*K 10 ..	De Schelde	1923	212	18·3	11·9	..	560 / 690	1,550 / 630 / 1,550 / 630 / 1,800 / 630	15 / 8	1 22-pr. 1 maxim	4	29	— / 45
*K 9		1922											
*K 8		1922											
*K 7	Fijenoord	1921	177·2	16·8	12·5	..	550 / 630	1,200 / 600	15 / 8	1 3-in., 1 maxim	6	29	— / 76
*K 6		1920											
*K 5		1919											
*K 4	De Schelde	1920	211·3	18·3	11·5	..	560 / 700	1,200 / 600 / 1,800 / 600	15 / 8	1 3-in., 1 maxim.	6	29	— / 45
*K 3		1919											
*K 2	Fijenoord	1919	172·2	16·8	12·5	..	550 / 600	1,800 / 600	15 / 8	1 3-in., 1 maxim	6	29	— / 76
*K 1	De Schelde	1913	159·6	15·4	10·2	..	315 / 374	1,800 / 650	15 / 8	..	3	17	— / 16

* Indian Military Marine.

Two submarines, O 13, O 14, are authorised for commencement at De Schelde Co., Flushing.

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Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Destroyers—													
Draug, Troll, Garm	Horten ..	1908–13	226	23·5	8·8	2	540	7,500	27·0	6 3-in. Draug has 6 4·7-in. in addition	3	71	95 / 6
First Class—													
Snogg, Stegg, Trygg	Horten ..	1919–1920	173·9	18	5½	2	220	3,500	25	2 3-in.	4	31	— / 30
Second Class—													
Hval	Elbing ..	1896–1900	130·0	16·0	6·9	1	100	1,100	21	2 1·4-in. Q.F.	2	19	— / 17
Storm, Brand, Trods	Horten ..												
Laks, Sild, Sael, Skrei	Horten ..	1901	126·4	15·0	6·9	1	100	1,100	21·8	2 1·4-in.	2	19	— / —
Kjek, Hvas, Kvik, Blink	Fredrikstad	1898	114·5	14·5	6·0	1	73	750	20	2 1·4-in.	2	..	— / 11
Lyn, Hauk, Falk ..	Horten ..	1903											— / —
Skarv, Teist	Horten ..	1906–7	133	14·9	6·5	1	100	1,700	25	2 3-pr.	2	18	— / 16
Lom, Jo, Grib.. ..			117	14·5	5·7	1	72	1,100	23	2 M.	2	16	— / 15
Ravn, Orn	Horten ..	1903	113	14·5	5·7	1	73	850	23	2 1·4-in.	2	16	— / —
Kjeld..	Horten ..	1912	135	14·9	6·4	1	100	1,800	25	2 3-pr.	2	19	— / 15
													— / 16
Submarines—													
A 2, 3, 4	Germania Kiel	1909 to 1913	133·2	15·7	8·9	2	246 / 332	900 / 380	14 / 7	—	3	17	— / 12·8
B 1, 2	Horten ..	1922											
B 3, 4	Horten ..	1923–24 Bldg.	167·3	17·5	9·5	..	413–545	900	14 5 / 10	1 3-in.	4	23	..
B 5, 6	Horten ..												

Soviet Union.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons		Knots.				Tons.
Destroyers—													
Kertch	Ship & Eng. Co., Nikolaev	1917	303·5	29·5	10·5	..	1326	29,000	33	4 4-in., 1 7-pr., 2 M., can carry 80 mines	12	120	— / 390
Feodinissi ..													
Petroviski ..													
Nezamojni ..													
Shaumyan ..													
Karl Marx ..	Revel.. ..	1915	344·5	31·3	9·7	..	1350	32,700	35	4 4-in., 1 2-pr., 2 M., 80 mines	9	110	— / 400
Jakov Sverdlov													
Ouritsky	Leningrad..	1914	321·5	30·5	9·25	..	1610	32,000	35	4 4-in., 1 2-pr., 2 M., 80 mines	9	110	— / 400
Volodarski ..													
Rykov (*ex* Letun)													
Engels		1914–1915	314·75	30·5	9·75	..	1260	30,000	35	4 4-in., 2 M., 1 2-pr., 80 mines	9	110	— / 350
Stalin													
Zinoviev													
Trotsky													
Lenin													
Bezpokoini* ..	Nikolaev ..	1913–14	307·7	29 5	9	..	1088	25,500	34	3 4-in., 2 3-pr., 4 M.	10	140	— / 260
Gnyevni* ..													
Derski*													
Pospyeshni* ..	Leningrad..	1913–14	321·5	30·5	9·8	..	1100	23,000	34	3 4-in., 2 3-pr., 4 M., 80 mines	10	..	..
Fruuze*													
Puilki*													

* Under French protection.

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Soviet Union—*continued.*

Name or Number.	Where Built.	Date of Completion.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surf./Sub.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
SUBMARINES—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Politrabotnik (*ex* Ag 26)	..	1924	150¼	15¾	5¼	..	355 / 467	480 / 320	13 / 11	1 6-pr.	4	..	..
Marxist (*ex* Ag 25)	..	1922	150¼	15¾	15¼	..	375 / 467	480 / 320	13 / 11	1 57-mm.			— / 17
Kommunist (*ex* Ag 24)	..	1922											
Shakter (*ex*-Ag 23), Ag 22*	..	1920								1 4-in.	6		
Kommunist	..	1917	..	..	..	..	260 / 400	..	13 / 7·5	..	2	..	
Proletary	..	1916	223	14·5	12·5		..	2640 / 900	16 / 9	1 6-pr., or 2 6-pr., 1 M.	4	33	— / 40
Yaz	..	1917											
Rabotchky	..	1917						2640 / 900	16 / 9	42 mines	4	..	
Tyulen*	..	1915	220	14·5	12·7		650 / 784	500 / 1400	10 / 11·7	1 4-in., 1 2-in., 2 M.	4	52	— / 21
Politruk	..	1913											
Utka*	..	1916	223	14·5	12·5		..	500 / 900	10 / 9	2 11-pr., 1 1-pr., 1 M.	4	52	— / 40
Burysevyestnik* ..	..	1918					..	2640 / 900	16 / 9	1 11-pr.	4	..	
Barrak	..	1917	223	14·5	12·6		..	500 / 900	10 / 9	2 6-pr., 1 1-pr., 1 M.	4	..	— / 40
Krasnoarmeyets ..	..	1917											
Komissar	..	1916											
Bolshevik	..	1916											
Komunar	..	1916											
Tovaristch	..	1916											
Krasnoflotetz ..	..	1916											

In addition to the above there are sixty older destroyers completed from 1895 to 1912 of very little if any fighting value. There are also twenty-four destroyers in various stages of completion, which it is very unlikely will ever be completed. Many of the above vessels are known to be practically useless until very extensively repaired and refitted.

* Under French protection.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
FLOTILLA LEADERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
3 in No.	Cartagena ..	Bldg. 1928											
Almirante Ferrandiz (No. 42)													
José Luis Diez (No. 43)	Cartagena ..	Bldg.	331¾	31·7	10·5	2	1,650	42,000	36	5 4·7-in., 13-in. A.A., 4 M.	6	..	— / 540
Lepanto (No. 44) ..													
Sanchez-Barcaiztegui	Cartagena ..	1926						40,000					
DESTROYERS—													
Alsedo		1922											
Velasco	Cartagena ..	1923	283	27	10·5	2	1,145	33,000	34	3 4-in., 2 2-pr. A.A.	4	70	— / 265
Juan Lazaga		1924											
Proserpina*	Clydebank ..	1897	229	22¼	9·9	2	457	7,500	30	2 14-pr. 2 6-pr. 2 1-pr.	2	74	90 / —
Bustamante*	Cartagena ..												
Villaamil*	Cartagena ..	1913–1915	221¼	22¼	5·6	..	364	6,250	28	5 6-pr.	4	70	80 / —
Cadarso	Cartagena ..												
TORPEDO BOATS—													
22 boats	Cartagena ..	1913–1922	164	16·5	4·9	3	177	3,750	26	3 3-pr.	3	31	33 / —
SUBMARINES—													
C 1, C 2	Cartagena ..	1928 Bldg.	247	20·8	13·5	..	900 / 1154	2000 / 750	16 / 9	1 4-in., 1 3-in. A.A.	6 21-in.	..	..
C 3–6													
B 1–6	Cartagena ..	1921–24	210	18·9	11·25	..	560 / 830	1400 / 850	16 / 10·5	1 3-in.	4 18-in.	28	— / 66
A 1–3	Spezia, Italy	1917	149·6	13·5	10·2	..	260 / 380	600 / 450	13 / 8·5	1 3-pr.	2	18	— / 8
Isaac Peral	Fore River Co., U.S.A.	1916	197	19	11	..	488 / 750	1200 / 680	15 / 10	1 3-in. A.A.	4	24	..

2 Flotilla Leaders are projected for construction at Cartagena, and the construction of 12 submarines is also authorised.

* Minelayers.

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Sweden.

Name or Number.	Where Built.	Launched.	Dimensions. Length (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Nils Ehrensköld .. O. H. Nordenskjold	Göteborg Malmö	1926	293	29·2	10·5	..	1,050	25,000	35	3 4·7-in., 2 40-mm. A.A., 2 M.	2 trpl.	..	— / 150
Magne	Thornycroft	1905								2 3-in., 4 6-pr., 2 M.	2 dbl.		
Wale	Malmo ..	1906											
Ragnar	Malmo ..	1909											
Sigurd	Gothenburg	1909	216	20·8	9	2	455	8,000–9,000	30·0	4 3-in., 2 M.	2 dbl.	67	80 / —
Vidar	Malmo ..	1909											
Hugin	Gothenburg	1909											
Munin	Malmo ..	1910											
Wrangel † .. .. Wachtmeister † ..	Gothenborg	1917	232·8	22	9·2	2	500	12,000	34·0	4 3-in., 2 M.	2 dbl.	72	167 / 6
TORPEDO-BOATS—													
Plejad, Castor, Pollux	Normand & Carlskrona	1905–1909											
Vega .. .. Vesta	Carlskrona ..	1909											
Spica, Astrea, Iris, Thetis	Bergsund and Gothenburg	1909	128	14·5	8·5	1	120	2,000	25	2 6-prs.	2	18	20 / —
Altair .. .. .. Antares .. .. .. Argo .. .. .. Arcturus	Stockholm ..	1908											
Perseus, Polaris .. Regulus, Rigel ..	Bergsund .. Stockholm ..	1910–1915											
SUBMARINES—													
1st Class—													
Draken .. .. .. Gripen	Naval Yard, Karlskrona	1926	..	..	..	..	500 / 650	2800 / —	15 / 9	1 6-pr.	4	..	..
Bavern .. .. .. Illern .. .. .. Uttern	Naval Yard, Karlskrona	1921	..	..	..	..	500 / 650	2800 / —	15 / 9	1 6-pr.	4	..	..
Delfinen	Bergsund Co., Stockholm	..	..	..	..	..	300	..	..	..	..	..	..
Svärdfisken .. .. Tumlaren	Kockum Co., Malmo												
Sälen .. .. .. Valrossen .. .. Hajen	Kockum Co., Malmo ..	1920	..	..	..	..	..	..	..	..	..	..	..
Minelaying Sub.—													
Valen	..	1925	..	..	..	..	..	..	..	..	..	..	..
2nd Class—													
Aborren .. .. .. Braxen .. .. .. Laxen .. .. .. Gäddan	Karlskrona D.Y.	1914–15	..	..	..	..	..	..	..	1 6-pr.	4	..	..
No. 4 .. .. .. No. 3 .. .. .. No. 2	..	1908–09	139·4	14·8	9·8	..	175 / 225	1000 / 200	15 / 8	..	2	17	..

† Fitted for mine-laying.

Also ten small 2nd class torpedo-boats, 60 tons, built 1907–1908.
One submarine is authorised.

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United States.

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
DESTROYERS—			Feet.	Feet.	Feet.		Tons		Knots.				Tons.
Pruitt	Bath, I.W.	1920											
Sicard													
Preble ..													
William B. Preston	Norfolk, N.W.	1920											
Noa		1921											
Hulbert ..		1920											
Decatur ..	Navy Yard, Mare Is.	1922											
Perry		1922											
Trever ..		1922											
Wasmuth ..		1921											
Zane		1921											
Litchfield ..		1920											
Melvin ..		1921											
Corry		1921											
Sumner ..		1921											
Fahrenholt		1921											
MacDonough		1921											
Hull		1921											
Bruce ..		1920											
Lamson ..	Bethlehem S.B. Co., Union Plant, San Francisco	1921											
Preston ..													
Coghlan ..													
Mullany													
Robert Smith													
Chase													
Mervine ..													
Marcus ..													
Selfridge ..													
Kidder ..													
Shirk													
Wood ..													
Sloat													
La Valette ..													
Yarborough													
Zeilin													
William Jones													
Paul Hamilton													
Kennedy ..													
Thompson ..			314·4	31	9·8	..	1,215	27,000	35	4 4-in., 1 14-pr. A.A.	4 triple	122	375
Farquhar ..													
Reno		1920											
Stoddert ..													
Somers ..													
Farragut ..													
John Francis Burnes													
Percival ..													
Osborne ..													
Charles Ausburn													
Billingsley ..													
Reid	Bethlehem S.B. Co., Squantum	1919											
Converse ..		1920											
Dale		1920											
Flusser ..													
Worden ..													
Putnam ..													
Lardner ..													
Case													
Isherwood ..													
Breck													
Toucy ..													
Sharkey ..													
Doyen ..													
Meyer		1919											
Henshaw ..													
Moody ..													
McCawley ..													
Sinclair ..													
Meade ..													
Swasey ..													
Tingey ..													
Morris ..													
Thornton ..													
Bailey ..													
Shubrick ..													
Ballard ..													

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United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.
			Length. Extreme.	Beam.	Draught.								Oil.
DESTROYERS—*continued.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Greene ..	Bethlehem S.B. Co., Squantum.												
Edwards ..													
McLanahan													
Laub													
McDermut ..													
Gillis													
Turner													
Aulick ..	Bethlehem S.B. Co., Quincy	1919											
Welles ..													
Bancroft ..													
Osmond Ingram													
Rodgers ..													
McCalla ..													
McCook ..													
Belknap ..													
Lawrence ..	New York S.B. Co.	1920											
Hopkins ..		1921											
Barry ..		1920											
Goff		1921											
Bainbridge ..		1921											
Reuben James													
Williamson													
Sands													
King													
Childs													
Sturtevant ..													
Overton ..													
James K. Paulding		1920											
McFarland ..													
Humphreys													
Kane													
Fox													
Gilmer ..													
Brooks ..													
Hatfield ..													
Paul Jones		1921											
Truxton ..		1921	314·4	31	9·8	..	1,215	27,000	35	4 4-in., 1 14-pr. A.A.	4 triple	122	375
John D. Ford													
Pillsbury ..													
Peary ..													
Pope													
Stewart ..													
McCormick													
Bulmer ..													
Simpson ..		1920											
MacLeish ..													
Edsall													
Parrott ..	Cramp, Pa.												
Whipple ..													
J. D. Edwards													
Borie													
Tracy ..													
Barker ..													
Smith Thompson													
Alden ..													
Broome ..		1919	..	..	..	..	..	..	..	Long and Hovey have 8 4-in. in twin mtgs.			
Long													
Hovey ..													
Southard ..													
Chandler ..													
Dallas													
Herndon ..													
Branch ..		1920											
George E. Badger													
Welborn C. Wood	Newport News S.B. Co.	1921											
Hunt		1920											
Abel P. Upshur		1920											
Mason ..		1920											
Satterlee ..		1919											
Semmes ..													
Goldsborough		1920											
Dahlgren ..													

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United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
DESTROYERS—*continued.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Clemson		..	..	..	..	..	..	..	..	..	..	..	375
Bagley													
Abbot	Newport News S.B. Co.												
Haraden		1919	314·4	31	9·8	..	1,213	27,000	35	4 4-in., 1 14-pr.	4 triple	122	286
Thomas													
Hopewell													
Stansbury		1920											
Howard		1920											
Hogan													
O'Bannon	Union I.W.												
Renshaw													
Mackenzie													
Kalk													
Foote													
Maddox		1919	314·4	31	9·8	..	1,191	27,000	35	4 4-in., 1 14-pr.	4 triple	122	283
Cowell													
Bush	Fore River S.B. Co.												
Meredith													
Crosby													
Walker													
Thatcher													
Palmer		1918											
Herbert													
Schenck	N.Y. S.B. Co.		314·4	31	9·8	..	1,211	26,000	35	4 4-in., 1 14-pr.	4 triple	122	286
Leary													
Dickerson													
J. Fred Talbot													
Cole													
Ellis													
Bernadou		1919											
Dupont													
Biddle													
Blakeley													
Barney	Cramp, Phil.		314·4	31	9·8	..	1,154	26,000	35	4 4-in., 1 14-pr.	4 triple	122	286
Breckenridge													
Roper													
Elliot													
Greer													
Upshur		1918											
Yarnall													
Tarbell													
Hamilton		1919											
Claxton		1919											
Ward	Mare Island, N.Y.	1918											
Kennison		1919											
Kilty		1918											
Boggs		1918	314·4	31	9·5	..	1,154	24,000	35	4 4-in., 1 14-pr.	4 triple	122	286
Tillman		1921											
Crowninshield													
Hale	Bath I.W.												
Aaron Ward													
Buchanan													
Jacob Jones		1919											
Babbitt													
Twiggs	New York S.B. Co.		314·4	31	9·8	..	1,211	26,000	35	4 4-in., 1 14-pr.	4 triple	122	286
Badger													
Tattnall													
Ramsay		1919											
Gamble													
Breese	Newport News S. Co.		314·4	31	9·8	..	1,213	25,000	35	4 4-in., 2 13-pr.	4 triple	122	286
Montgomery													
Radford													
Lamberton													
Lea		1918											
Dorsey													
Dent	Cramp, Pa.		314·4	31	9·8	..	1,154	26,000	35	4 4-in., 1 14-pr.	4 triple	122	286
Waters													
Talbot													
Rathburne													
Crane		1919											
Williams		1919											
Hazelwood	Union Plant.	1919											
Chew			314·4	31	9·8	..	1,191	27,000	35	4 4-in., 1 14-pr.	4 triple	122	283
Mugford													
Champlin													
Schley													
Bell	Fore River S.B. Co.	1918											
Taylor	Mare Island, N.Y.		314·4	31	9·8	..	1,154	24,200	35	4 4-in., 1 14-pr. A.A.	4 triple	122	286
Fairfax													

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United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
DESTROYERS—*continued.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Gridley ..	Union I.W.	1919	314·4	31	9·9	..	1,191	27,000	35	4 4-in., 1 14-pr. A.A.	4 triple	122	286
Harding ..		1919											
McKean ..		1919											
Ringgold ..		1918											
Robinson ..		1918											
McKee		1918											
Stephens ..	Fore River S.B. Co.		314·4	40	9·8	..	1,191	27,000	35	4 4-in., 1 14-pr. A.A.	4 triple	122	283
Colhoun ..													
Dyer													
Stringham ..													
Gregory ..													
Sigourney ..		1918											
Kimberly ..													
Little													
Evans	Bath I.W.		314·4	40	9·7	..	1,154	24,200	35	4 4-in., 1 14-pr. A.A.	4 triple	122	286
Philip													
Wickes ..													
Manley ..		1917	315·5	30·7	9·5	..	1,125	20,000	32	3 4-in., 1 14-pr. A.A.	4 triple	122	260
Stockton ..	Cramp Pa.	1917	315·5	30·7	9·5	..	1,125	18,500	30	5 4-in., 1 14-pr. A.A.	4 triple	122	260
Conner ..		1918											
Gwin	Seattle D.D. Co.	1920	315·5	30·7	9·5	..	1,125	18,750	30	4 4-in., 1 14-pr. A.A.	4 triple	122	260
Craven ..	Norfolk, N.Y.	1918	315·5	30·7	9·5	..	1,125	20,000	32	4 4-in., 1 14-pr. A.A.	4 triple	122	260
Caldwell ..	Mare Island N.W.	1917	315·5	30·7	9·5	..	1,125	20,000	30	4 4-in., 1 14-pr. A.A.	4 triple	122	260
Allen	Bath I.W.	1917	315·3	29·9	9·8	..	1,071	17,500	30	4 4-in., 1 14-pr. A.A.	4 triple	122	290
Rowan ..	Fore River S.B. Co.	1916	315·3	29·9	10·7	..	1,111	17,000	29·5	4 4-in., 1 14-pr. A.A.	4 triple	122	290
Sampson ..													
Wadsworth..	Bath I.W.	1915	315·3	29·9	10	..	1,060	17,000	30	4 4-in.	4 dbl.	118	310
Cushing ..	Fore River S.B. Co.	1915	305·3	30·4	10·5	..	1,090	16,000	29	4 4-in.	4 dbl.	106	308
Winslow ..													
Nicholson ..		1915	305·3	30·3	10·5	..	1,050	16,000	29	4 4-in.	4 dbl.	106	307
O'Brien ..													
Balch	Cramp.	1914	305·3	30·5	10·5	..	1,036	16,000	29·5	4 4-in.	4 dbl.	106	310
Benham ..		1914											
Parker ..		1913											
Aylwin ..		1914											
Duncan ..	Fore River S.B. Co.	1913	305·3	30·4	10	..	1,014	16,000	29	4 4-in.	4 dbl.	106	308
DESTROYERS NOW FITTED AS MINELAYERS—													
Rizal	Union I.W.	1919	314·4	31	9·8	..	1,191	27,000	35	4 4-in., 1 14-pr. A.A. 92 mines	..	107	283
Sprostan ..		1919											
Anthony ..		1919											
Burns		1919											
Ludlow ..		1918								3 4-in. 1 14-pr. A.A. 92 mines			
Ingraham ..		1919								4 4-in., 1 14-pr. A.A. 92 mines			
Hart		1919											
Mahan ..	Fore River S.B. Co.		314·4	31	9·8	..	1,191	27,000	35	3 4-in., 1 14-pr. A.A. 92 mines.	..	107	283
Lansdale ..													
Maury ..										4 4-in., 1 14-pr. A.A. 92 mines			
Luce													
Israel		1918											
Murray ..										3 4-in., 1 14-pr. A.A. 92 mines			
Stribling ..										4 4-in., 1 14-pr. A.A. 92 mines			

In addition to the above there are 21 obsolete destroyers of the Flusser Class, completed 1910–1912. Their displacement is 742 tons, 29·5 knots, carrying 5 or 4 13-pdrs. and 3 double torpedo tubes. Their names are Mayrant, Henley, Jarvis, Beale, Fanning, Jenkins, Jouett, Patterson, Walke, Monaghan, Ammen, Trippe, Warrington, Burrows, McCall, Sterrett, Perkins, Drayton, Terry, Paulding, Roe. 4 Destroyers are authorised (money voted) and 8 projected: Nos. 348–359.

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United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surface. / Submerged.	Horse-Power.	Maximum Speed. Surface. / Submerged.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots				Tons.
SUBMARINES—													
V4	Portsmouth Navy Yard.	1928	380	33·7	—	..	2,890	2,800 / —	15 / 8	1 6-in., 60 mines	4	..	..
V5	Portsmouth Navy Yard.	Bldg.	..	..	..	..	2,890	..	17 / —	..	..	..	..
V6	Mare Island Navy Yard.												
V3	Portsmouth Navy Yard.	1926	341·5	27·5	15·5	..	2,160 / 2,520	6,500 / —	21 / 9	1 5-in. 2 maxim	6	87	..
V2		1925											
V1		1924											
S51	Lake T.B. Co., Bridgeport	1922	240	21·8	13·5	..	990 / 1,230	1,800 / 1,500	14·8 / 11·0	1 4-in.	5	..	148
S50													
S49													
S48													
S47*	Bethlehem Shipbuilding Corp., Quincy Plant	1925	225·3	20·7	16	..	906 / 1,126	1,200 / 1,500	14 / —	1 4-in.	4	40	154
S46*		1925											
S45*		1925											
S44*		1925											
S43*		1924											
S42*		1924											
S41*	Bethlehem Shipbuilding Corp., Union Plant	1924	219·3	20·7	16	..	854 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in.	4	..	140
S40*		1923											
S39*		1923											
S38*		1923											
S37*		1923											
S36*		1923											
S35*		1923											
S34*		1923	219·3	20·7	16	..	854 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in.	4	38	140
S33*		1923											
S32*		1923											
S31*		1920											
S30*		1924											
S29*	Bethlehem Shipbuilding Corp., Quincy Plant	1923	219·3	20·7	16	..	854 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in.	4	38	140
S28*		1924											
S27*		1923											
S26*		1923											
S25*		1923											
S24*		1923											
S23*		1924											
S22*		1923											
S21*		1922											
S29*		1921											
S19*		1923											
S18*		1921											
S17	Lake T.B. Co., Bridgeport	1920	231	21·8	13	..	854 / 1,092	1,000 / 1,200	13·5 / 12·3	1 4-in.	4	38	123
S16		1921											
S15		1921											
S14		1923											
S13		1923	231	21·8	13	..	876 / 1,092	2,000 / 1,200	15·8 / 12·3	1 4-in.	5	38	123
S12		1923											
S11		1922											
S10	Navy Yard, Portsmouth	1921	231	21·8	13	..	876 / 1,092	1,400 / 1,200	15 / 12·3	1 4-in.	4	38	123
S9		1920											
S8		1920											
S7		1920											
S6		1919											
S4		1919											
S3													
S2	Lake T.B. Co.	1920	207	19·6	16·2	..	800 / 980	1,800 / 1,210	16 / 11	1 4-in.	4	38	88
S1*	Fore River S.B. Co.	1920	219·3	20·7	16	..	854 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in., 1 aeroplane	4	38	140
T3*	Bethlehem Shipbuilding Corp.. Quincy Plant	1920	269·8	22·8	12·8	..	1,110 / 1,490	4,400 / 1,520	20 / 11·5	1 4-in.	6	..	76
T2*		1922											
T1*		1920											
R27	Lake T.B. Co., Bridgeport	1919	175	16·6	13·9	..	495 / 600	1,000 / 800	14 / 11	1 3-in.	4	30	60
R26													
R25													
R24													
R23													
R22													
R21													

* Designed by Electric Boat Co., Groton, Conn.

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United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surface. / Submerged.	Horse-Power.	Maximum Speed. Surface. / Submerged.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots				Tons.
SUBMARINES—*continued.*													
R20*	Union, I.W.	1918	186·1	18	14·5	..	570 / 680	880 / 934	13·5 / 10·5	1 3-in.	4	30	63
R19*		1918											
R18*		1918											
R17*		1918											
R16*		1918											
R15*		1918											
R14*		1919											
R13*		1919											
R12*													
R11*													
R10*													
R9*													
R8*													
R7*	Fore River S.B. Co.	1919											
R6*													
R5*													
R4*													
R3*													
R2*													
R1*													
O16	Lake T.B. Co., Bridgeport	1918	175	16·3	13·8	..	485 / 566	1,000 / 880	14 / 11	1 3-in.	4	30	62
O15													
O14													
O13													
O12													
O11													
O10*	Fore River S.B. Co.	1918	172·3	18	14·4	..	520 / 630	880 / 740	14 / 10·5	1 3-in.	4	30	73
O9*													
O8*													
O7*													
O6*													
O4*													
O3*													
O2*†	Navy Yard, Puget Sound												
O1*†	Navy Yard, Portsmouth												
H9*‡	Navy Yard, Puget Sound	1918	150·3	15·8	12·4	..	358 / 434	480 / 600	12¾ / 10¼	..	4	26	38
H8*‡													
H7*‡													
H6*‡													
H5*‡													
H4*‡													
N3*	Morento, Seattle	1917	147·3	15·8	12·5	..	348 / 414	480 / 560	13 / 11	..	4	26	20
N2*													
N1*													
L11*	Fore River S.B. Co.	1916	168·5	17·4	13·6	..	450 / 550	900 / 680	14 / 10·5	1 3-in.	4	29	65
L9*													
L3*													
L2*													
K8*	Union I.W., San Francisco F.R.S. Co.	1914	153·5	16·7	13	..	392 / 520	480 / 680	14 / 10·5	..	4	26	57
K7*													
K6*													
K5*													
K4*	Moran Co., Seattle, Wash. Union I.W., San Francisco F.R.S. Co.												
K3*													
K2*													
K1*													
H3*	Moran Co., Seattle, Wash.	1914	150·3	15·8	12·4	..	358 / 434	480 / 600	14 / 10·5	..	4	26	32
H2*	Union I.W., San Francisco	1913											

Three more V Class submarines are authorised (money voted) and a submarine named Neff is projected.
All submarines older than O1 are termed second-line submarines, suitable only for coast defence.
* Designed by Electric Boat Co., Groton, Conn.
† Built under licence from Electric Boat Co.
‡ Built from parts constructed by E.B.Co. for Russian Govt.
The machinery contractors for the 78 vessels of the E.B.Co. Design built in yards other than the Navy Yards were the New London Ship and Eng. Co., Groton, Conn., and the hulls were built under sub-contract from the E. B. Co.

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TABLES OF COMPARATIVE NAVAL STRENGTH

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TABLE I.—EFFECTIVE FIGHTING SHIPS, BUILT AND BUILDING.

Class.	British Empire.			U.S.A.			Japan.			France.			Italy.			Soviet Union.			Germany.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
Battleships, 14-in. guns and upwards	12	—	12	14	—	14	6	—	6	—	—	—	—	—	—	—	—	—	—	—	—
Battle-cruisers, 14-in. guns and upwards	3	—	3	—	—	—	4	—	4	—	—	—	—	—	—	—	—	—	—	—	—
Battleships, smaller guns	4	—	4	4	—	4	—	—	—	9	—	9	5	—	5	5	1	6	8	1†	9
Battle-cruisers, smaller guns	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Aircraft-carriers and aircraft tenders	7	2	9	4	—	4	4	1	5	1	1	2	1	—	1	—	—	—	—	—	—
Cruisers	55	8 2†	65	31	8	39	25	8	33	14	3	17	12	6	18	6	2	8	9	3	12
Flotilla Leaders and Destroyers	165	9 9†	183	276	4†	300	101	13 4†	118	65	18	83	76	16	92	81	24	105§	21	6	27
Submarines	52	12 6†	70	122	2 3†	127	67	10	77	53	32 4†	89	42	14	56	20	—	20	—	—	—

† Authorized for laying down during current year.
§ It is very improbable that the vessels building will be completed. The military value of many of these vessels is small.

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TABLE II.—BATTLESHIPS WITH 14-IN. GUNS AND UPWARDS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement. (Washington Treaty.)	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.			tons.			tons.												
1925	Nelson	35,000	1921	Colorado	32,600	1920	Mutsu ...	33,800												
1925	Rodney		1921	West Virginia		1919	Nagato ...													
1915	Malaya	30,000	1920	Maryland ...	32,300	1917	Hyuga ...	31,260												
1914	Vallant	30,000	1919	Tennessee ...		1916	Ise													
1914	Barham	30,000	1919	California ...		1915	Yamashiro	30,600												
1913	Queen Elizabeth	31,100	1917	Idaho	32,000	1914	Fuso													
1913	Warspite	31,100	1917	New Mexico ...																
1915	Royal Sovereign	29,150	1917	Mississippi ...	31,400															
1914	Royal Oak ...		1915	Arizona																
1915	Revenge ...		1915	Pennsylvania	27,500															
1915	Resolution ...		1914	Oklahama ...																
1916	Ramillies ...		1914	Nevada	29,600															
			1912	Texas																
			1912	New York ...																
	12 ships.	367,950		14 ships.	435,400		6 ships.	191,320												

TABLE III.—BATTLE-CRUISERS WITH 14-IN. GUNS AND UPWARDS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement. (Washington Treaty.)	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.						tons.												
1918	Hood...	42,100				1913	Kirishima	27,500												
1916	Renown	22,000				1913	Haruna													
1916	Repulse					1912	Hiyei ...													
						1912	Kongo ...													
	3 ships.	106,100					4 ships.	110,000												

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TABLE IV.—BATTLESHIPS WITH SMALLER GUNS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement. (Washington Treaty.)	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Standard Displacement. (Washington Treaty.)	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.			tons.						tons.			tons.			tons.			tons.
1913	Benbow	26,250	1911	Arkansas	28,500				1913	Bretagne	23,128	1913	Andrea Doria	22,630	1914	General Alexieff	22,600	1905	Hannover ..	13,200
1913	Emperor of India		1911	Wyoming					1913	Lorraine...		1913	Caio Duilio ...		1911	Pariskaia Kommuna	23,000	1906	Schleswig-Holstein	
1912	Marlborough ...		1910	Florida ...	21,825				1913	Provence		1911	Conte di Cavour	22,030				1906	Schlesien ...	
1912	Iron Duke		1909	Utah ...					1911	Courbet ...		1911	Giulio Cesare	22,725	1911	Marat ...		1902	Braunschweig	13,000
									1911	Jean Bart	23,128	1910	Dante Alighieri	19,250	1911	Michael Frunze		1903	Preussen ...	
									1912	Paris ...		1907			1911	October Revolution		1903	Hessen ...	
									1909	Diderot ...	18,592							1903	Elsass ...	
									1909	Condorcet					1916	Demokratiya ... (building)	27,300	1904	Lothringen	
									1909	Voltaire ..										
	4 ships.	105,000		4 ships.	100,650					9 ships.	194,544		5 ships.	109,265		6 ships.	141,900		8 ships.	104,600

TABLE V.—BATTLE-CRUISERS WITH SMALLER GUNS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement. (Washington Treaty.)	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.																		
1913	Tiger	28,900																		
	1 ship.	28,900																		

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TABLE VI.—CRUISERS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Speed.	Name.	Standard Displacement (Washington Treaty.)	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Standard Displacement. (Washington Treaty.)	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
	2 authorized ...	10,000	35	Omaha ...		33	Naka		27½	Metz ... ... (*ex* Konigsberg)	6,100	28½	Taranto ... ... (*ex* Strassburg)	4,837	29½	Profintern ...	6,800	22	Berlin ...	3,250
	Norfolk	10,000	35	Milwaukee		33	Sendai ...		28½	Mulhouse ... ... (*ex* Stralsund)	5,120	28	Quarto	3,388	29½	Chevonaya-ukrainia...	7,600	22	Hamburg ...	
	Dorsetshire ...	10,000	34·4	Cincinnati ...		33	Jindzu ...		27	Strasbourg ... (*ex* Regensburg)	5,511	27½	Ancona ... ... (*ex* Graudenz)	5,210	23	General Kornilov	6, 75	21	Arkona ...	2,700
	Exeter	8,400	35	Raleigh ...		33	Nagara ...		27	Thionville ... ... (*ex* Novara)	3,500	27½	Bari ... ... (*ex* Pillau)	4,252	23	Komintern	6,675	21	Medusa ...	
	York	8,400	35	Detroit ...	7,500	33	Kinu	5,570	27	Strasbourg ... (*ex* Regensburg)	5,511	27	Brindisi ... ... (*ex* Helgoland)	3,440	19	Almaz ...	3,300	21	Amazone ...	2,650
32½	*London*		35	Richmond ...		33	Abukuma ...		27	Thionville ... ... (*ex* Novara)	3,500	27	Venezia ... ... (*ex* Saida)	3,445	20	S.S.S.R. ...	6,730	21	Thetis... ...	
32½	*Devonshire* ...	10,000	35	Concord ...		33	Natori ...		23	Waldeck Rousseau	13,828	22	Libia...	4,395	29·5	*Istomin* ...	7,600	21	Nymphe ...	
32½	*Shropshire* ...		35	Trenton ...		33	Isudzu ...		23	Edgar Quinet ...		23	San Giorgio ...	10,000				21	Niobe	
32½	*Sussex*		35	Marblehead		33	Yura		23	Ernest Renan ...	13,500,	23	San Marco ...	10,915				29	Emden ...	5,600
32	Berwick... ...		35	Memphis ...		33	Kuma... ...		22	Jules Michelet...	1,40 0	23	Pisa	10,430				32	Konigsberg	6,000
32	Cornwall ...		24	Chester ...		33	Tama		34	Duguay-Trouin		36	Trento ...	10,000				32	*Karlsruhe* ...	6,000
32	Kent	10,000	24	Birmingham	3,750	33	Kitakami ...	5,500	34	La Motte Picquet	7,873	36	Trieste ...					32	*Koln*	6,000
32	Suffolk		24	Salem		33	Kiso		34	Primauguet ...		37	*Alberto da Guissano*						E...	6,000
32	Cumberland ...		21	Olympia ...	6,000	33	O-I		34	Tourville	10,000	37	*Alberico di Barbiano*	5,000						
32	Australia (A)	10,000	20	Albany ...	3,430	33	Yubari ...	3,100	34	Duquesne		37	*Bartolomeo Colleoni*							
32	Canberra (A)...		20	New Orleans	3,430	33	Tenryu ...	3,500	34	Suffren	10,000	37	*Giov. della Bande Nere*							
33	Emerald ...	7,100	16½	Galveston ...		33	Tatsuta ...		33	*Colbert*	10,000		*Zara*	10,000						
33	Enterprise ...		16½	Chattanooga		26	Yahagi ...		33	C 2	10,000		*Fiume*							
30	Effingham ...	9,770	16½	Denver ...	3,200	26	Hirado ...	4,950	25	Training Cruiser	6,500									
30	Frobisher ...	9,860	16½	Des Moines		26	Chikuma ...													
30	Hawkins ...	9,800	16½	Cleveland ...		23	Tone	4,100												
29	Despatch ...	4,850	21	Rochester ...	8,150	33	Kako													
29	Diomede (N.Z.)		22	Charlotte		33	Furutaka ...	7,100												
29	Durban		22	Missoula	14,500	33	Kinugasa ...													
29	Delhi		22	Seattle		33	Aoba													
29	Dunedin (N.Z.)	4,850	22	St. Louis	9,700	33	*Nachi*	0 ,000												
29	Danae		22	Charleston		33	*Myoko*... ...													
29	Dauntless ...		22	Huron		33	*Ashigara* ...	10,000												
29	Dragon		22	Frederick	13,680	33	*Haguro* ...													
29	Capetown ...		22	Pittsburg			*Takao* ...													
29	Cairo		22	Huntington			*Atago* ...	10,000												
29	Calcutta ...	4,200					*Chokai* ...													
29	Carlisle						*Maya* ...													
29	Colombo... ...																			
29	Cardiff	4,290																		
29	Coventry ...																			

(A) Australian Navy.

(N.Z.) New Zealand Navy.

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TABLE VI.—CRUISERS (*continued*).

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Speed.	Name.	Standard Displacement (Washington Treaty.)	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Standard Displacement. (Washington Treaty.)	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
29	Curlew	4,290	32½	*Salt Lake City* ...	10,000															
29	Ceres			*Pensacola* ...	10,000															
29	Curacoa																			
29	Caledon	4,180		No. 26 ...																
29	Calypso			*Chester* ...																
29	Caradoc ...			No. 28 ...	10,000															
29	Concord	4,120	32·7	*Chicago* ...																
29	Centaur			*Houston*																
29	Cambrian ...	3,920		*Augusta*																
29	Canterbury ...																			
29	Constance ...																			
29	Castor																			
29	Champion ...																			
29	Calliope																			
29	Comus	3,895																		
29	Conquest ...																			
29	Carysfort ...																			
29	Cleopatra ...																			
28½	Vindictive ...	9,996																		
25½	Birmingham ...	5,120																		
25½	Lowestoft ...																			
25½	Adelaide (A) ...	5,100																		
25½	Yarmouth ...	4,860																		
25½	Dartmouth ...																			
25½	Brisbane (A) ...	5,120																		
25½	Sydney (A) ...																			
25½	Melbourne (A)																			
	64 ships.	401,976		39 ships.	320,880		33 ships.	215,080		17 ships.	153,906		18 ships.	120,312		8 ships.	59,655		13 ships.	52,050

(A) Australian Navy. (N.Z.) New Zealand Government.

NOTE.—Vessels of which the names are printed in italics are under construction.

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TABLE VII.—AIRCRAFT-CARRIERS AND AIRCRAFT TENDERS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement. (Washington Treaty.)	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Standard Displacement. (Washington Treaty.)	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.			tons.			tons.			tons.			tons.			tons.			
1916	Furious ...	22,450	Con-	Langley ...	12,700	1920	Notoro ‡	15,400	1920	Béarn † ...	21,160	1923	Miraglia	4,881		Orlitza ...	3000			
1917	Argus ...	14.000	verted	(formerly col-		1921	Hosho ...	9,500		*Commandant Teste*	9,840									
1917	Pegasus	3,150	1921	lier Jupiter)		—	Waka-													
1914	Ark Royal	6,900	Do.	Wright... ...	11,000		miya	5,870												
1919	Hermes ...	10,850		Lexington *...	33,000	1925	Akagi *	26,900												
1918	Eagle *	22,600		Saratoga * ...			*Kaga* †	26,900												
1916	Courageous	22,500																		
1916	*Glorious**	22,500																		
	Albatross (A)	5,000																		
	9 ships.	129,950		4 ships.	89,700		5 ships.	84,570		2 ships.	31,000		1 ship.	4,881		1 ship.	3,000		Nil	—

* Designed as battle-cruisers; converted to aircraft-carriers under the Washington Treaty.
† Designed as battleships.
‡ Converted from an oiler.
(A) Australian Navy.

NOTE.—Vessels of which the names are printed in italics are under construction.

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PLANS

OF

BRITISH AND FOREIGN WARSHIPS.

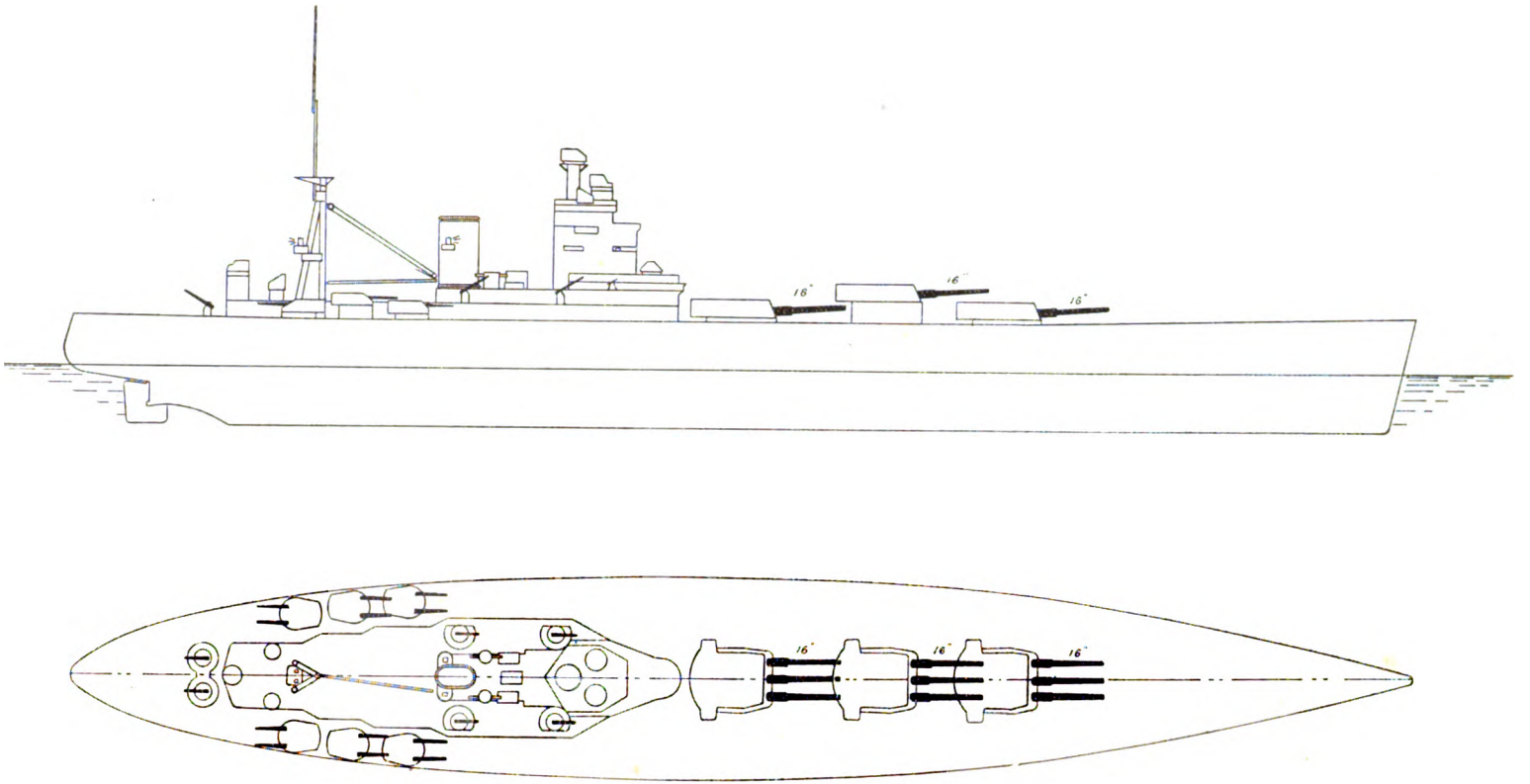
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GREAT BRITAIN.

BATTLESHIPS.

Nelson. **Rodney.**



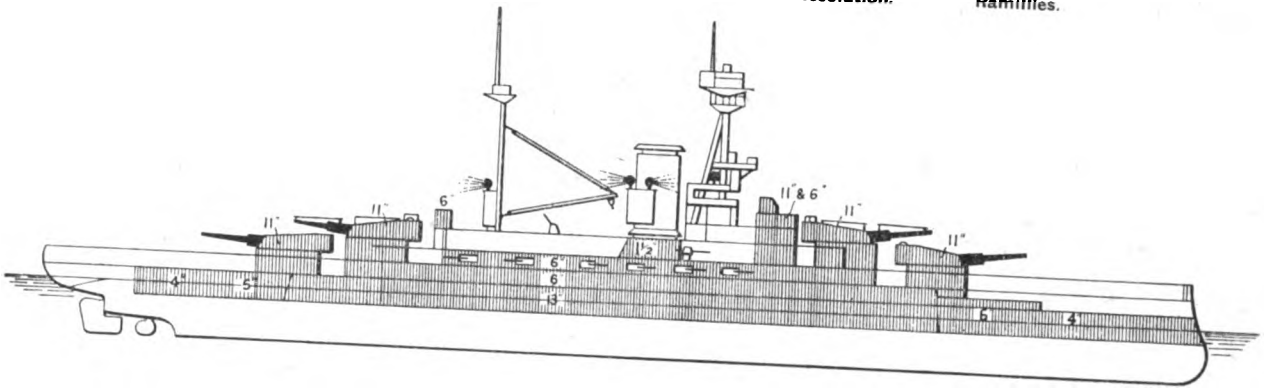
Length (extreme), 710 ft.; 35,000 tons; Speed, 23 knots.
Armament, 9—16-in.; 12—6-in.; 6—4·7-in. A.A.; 4—3-pr.; 8—2-pr. Pom Poms; 10 L.; 5 M.

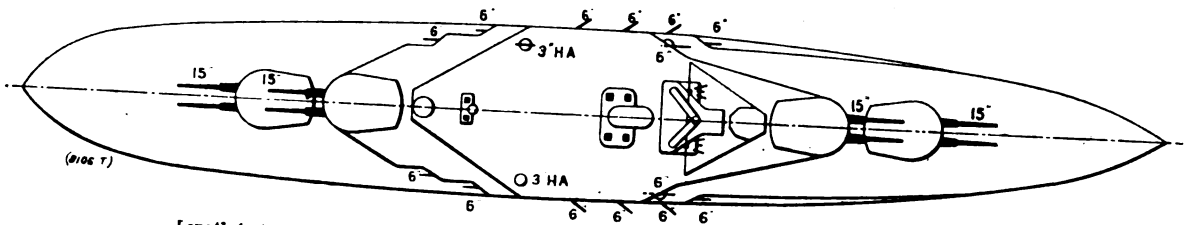
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GREAT BRITAIN.

BATTLESHIPS.

Royal Sovereign. **Royal Oak.** **Revenge.** **Resolution.** **Ramillies.**





Length (extreme), 620 ft. 6 ins.*; Length B.P., 580 ft.; 29,150 tons; Speed, 23 knots; Completed, 1916–17.
Armament, 8—15 in.; 14—6 in.; 2—4-in. A.A.; 4—3-pr.; 5 M; 10 L.
Searchlights on mainmast removed.

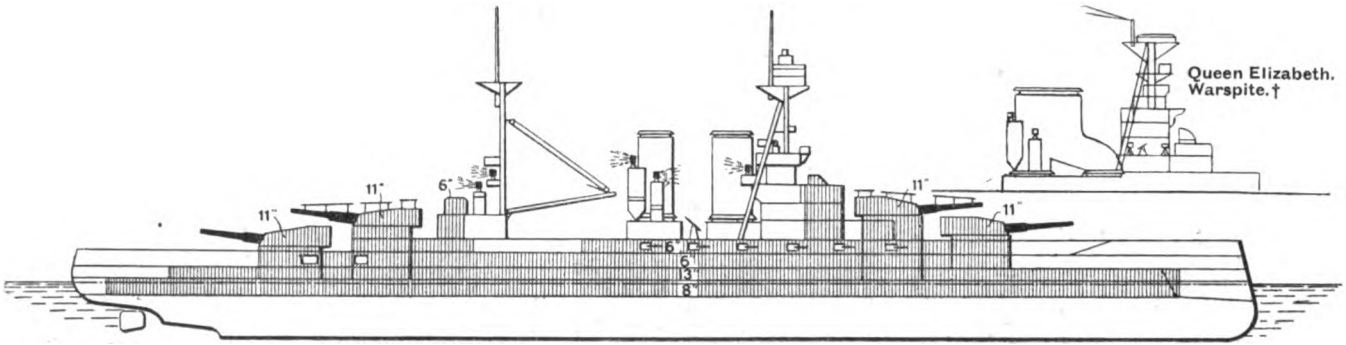
* Revenge, 625 ft. 9 in.

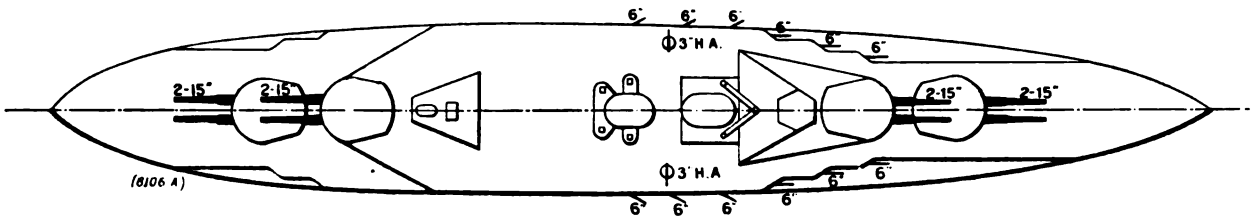
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GREAT BRITAIN.

BATTLESHIPS.

Queen Elizabeth. Warspite. Barham. Valiant. Malaya.





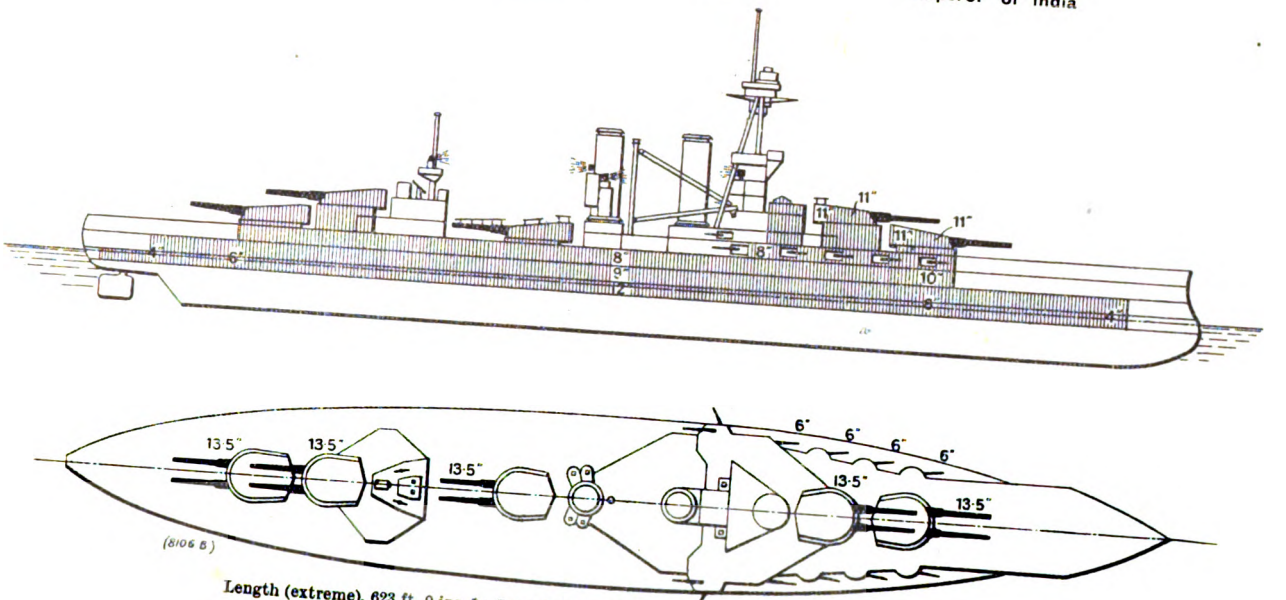
Length (extreme), 644 ft.* ; Length B.P., 600 ft. ; 30,000 tons ; Speed, 25 knots ; Completed, 1915–1916.
Armament, 8—15-in. ; 12—6-in. ; 4—4-in. A.A. ; 4—3-pr. ; 5 M. ; 10 L.
Queen Elizabeth and Warspite displacement as bulged, 31,100 tons. Searchlights abaft mainmast removed.
* Malaya and Valiant 640 ft.
† The other vessels of the class will be modified similarly in due course.

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GREAT BRITAIN.

BATTLESHIPS.

Iron Duke. **Marlborough.** **Benbow.** **Emperor of India**



Length (extreme), 623 ft. 9 ins. *; Length B.P., 580 ft.; 26,250 tons; Speed, 21 **knots**; Completed, 1914.
Armament, 10—13·5-in.; 12—6-in.; 2—3-in. H.A.; 4—3-pr.; 5 M; 10 L.

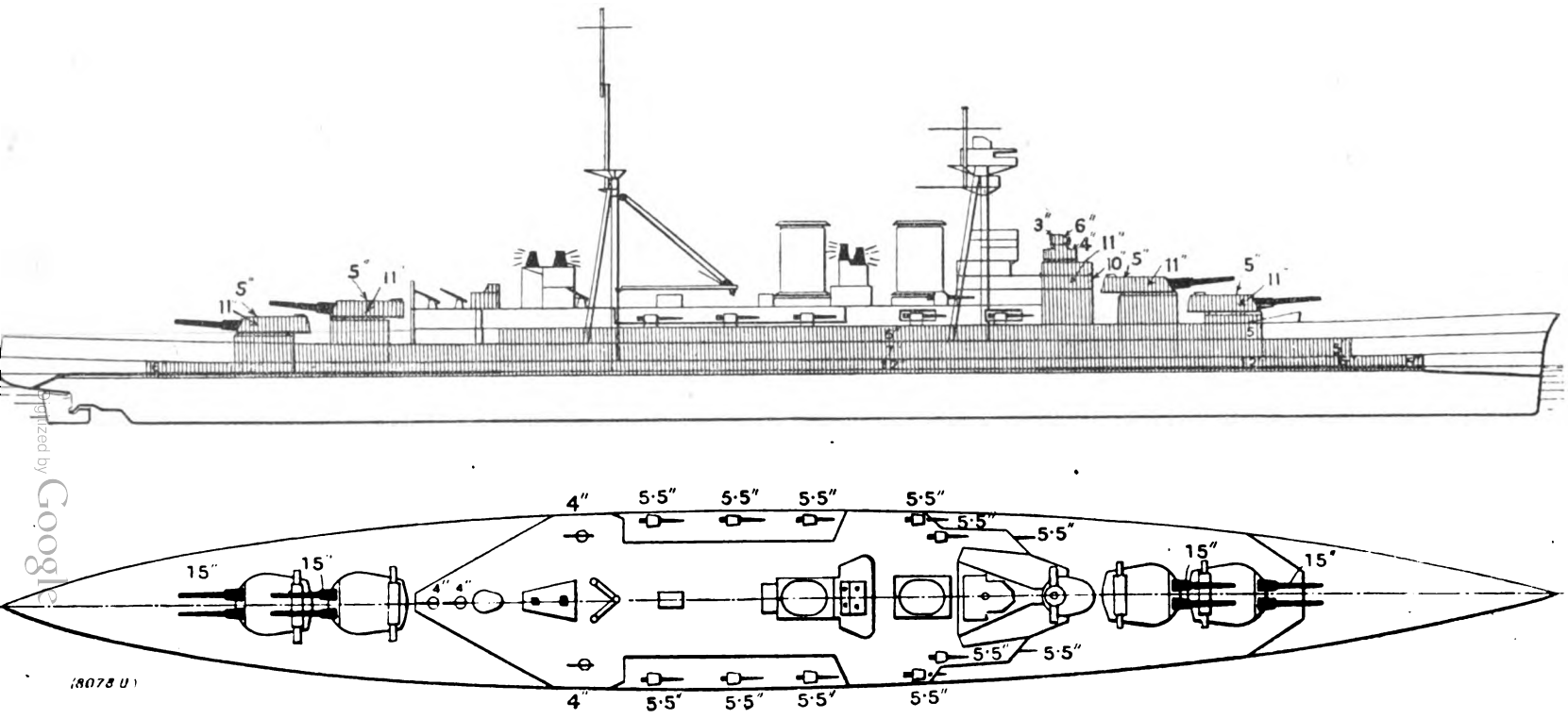
* Marlborough, 623 ft.; Emperor of India, 624 ft. 7 ins.

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GREAT BRITAIN.

BATTLE-CRUISER.

Hood.



(8078 U)

Length (extreme) 860 ft. 10 ins.; Length B.P., 810 ft.; 42,100 tons; Speed, 31* knots; Completed, 1920.
Armament, 8—15-in.; 12—5·5-in.; 4—4-in A.A.; 4—3-pdr.; 5 M.; 10 L.

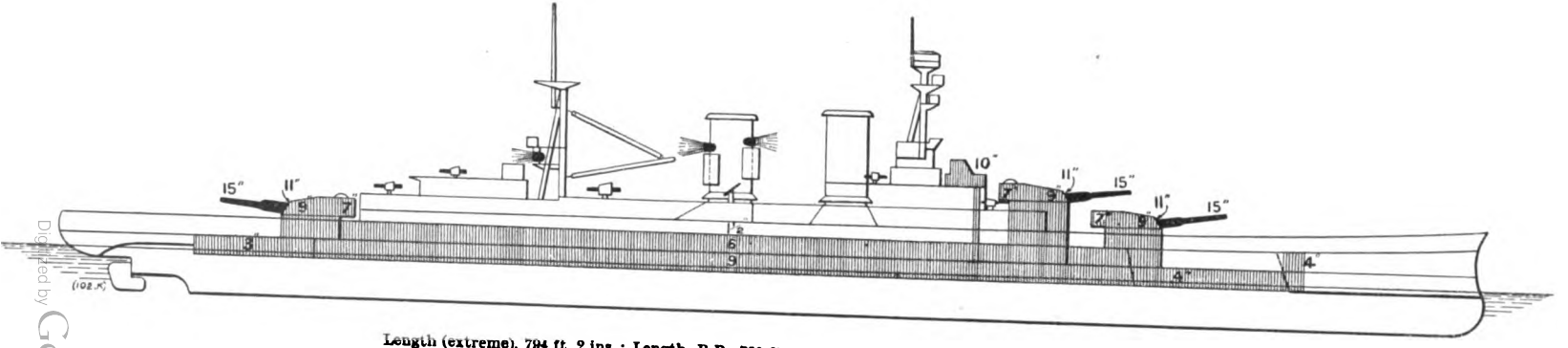
* Trials at 44,600 tons, 31·89 knots with 151,000 S.H.P.

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GREAT BRITAIN.

BATTLE-CRUISERS.

Repulse. **Renown.**



Length (extreme), 794 ft. 2 ins.; Length, B.P., 750 ft.; 32,000 tons; Speed, 31·5 knots; Completed, 1916.
Armament, 6—15-in.; 15—4-in.; 4—3-pr.; 4—4-in. A.A.; 5 M.; 10 L.

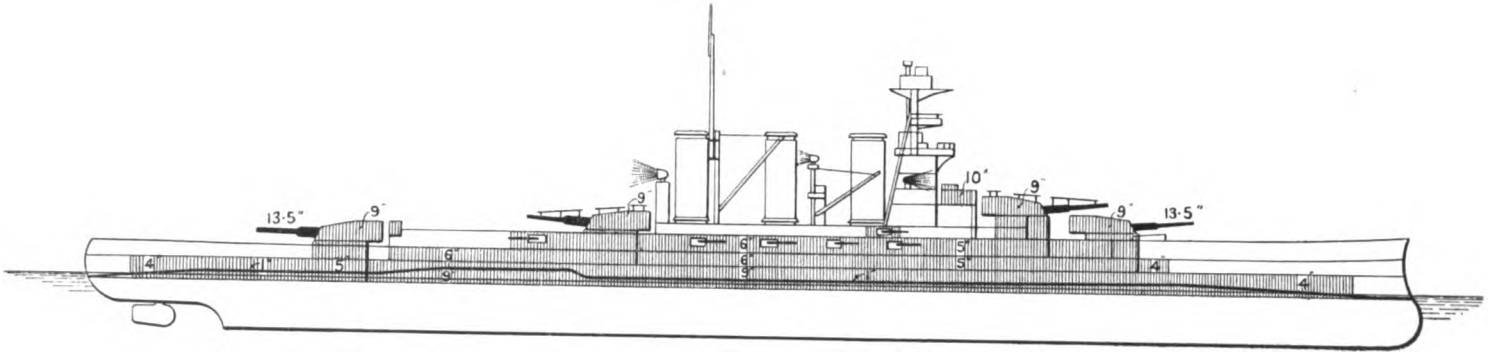
NOTE.—Repulse originally had a 6-in. main belt, but was re-armoured in 1920–21. Re-armouring of the Renown is allowed for by Chapter II., Part 3, Section (*d*) 2, of the Treaty of Washington, and was completed during 1926.

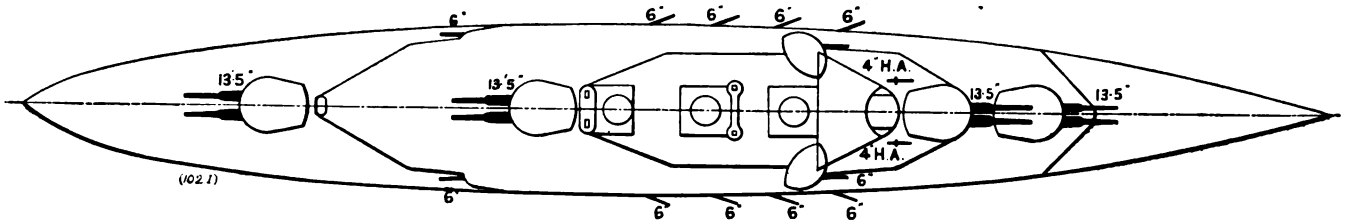
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GREAT BRITAIN.

BATTLE-CRUISER.

Tiger.





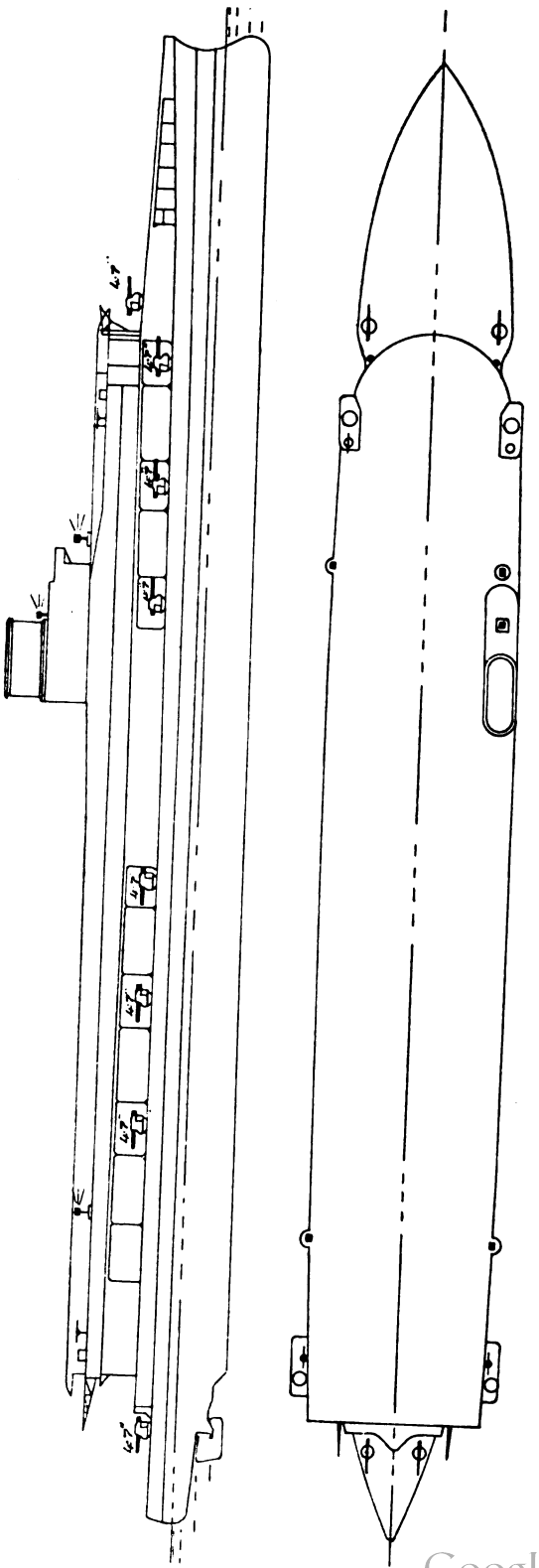
Length (extreme), 702 ft.; Length B.P., 660 ft.; 28,900 tons; Speed, 30 knots; Completed, 1914.
Armament, 8—13·5-in.; 12—6-in.; 4—3-pr.; 4—3-in. A.A.; 5 M.; 10 L.

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GREAT BRITAIN.

AIRCRAFT CARRIERS.

Courageous. Glorious.



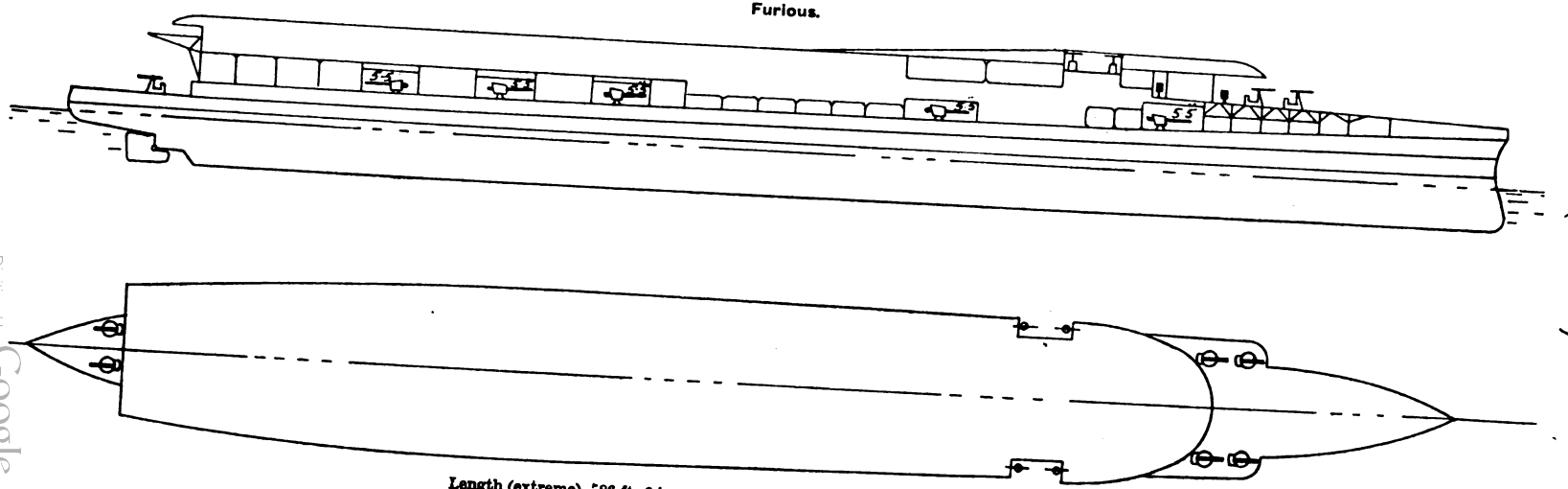
Length (extreme), 786 ft. 6 ins.; 22,500 tons; Speed, 31 knots.
Armament, 16—4·7-in.; 4—3-pr.; 4—2-pr.; 4 M.; 10 L.

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GREAT BRITAIN.

AIRCRAFT CARRIER.

Furious.



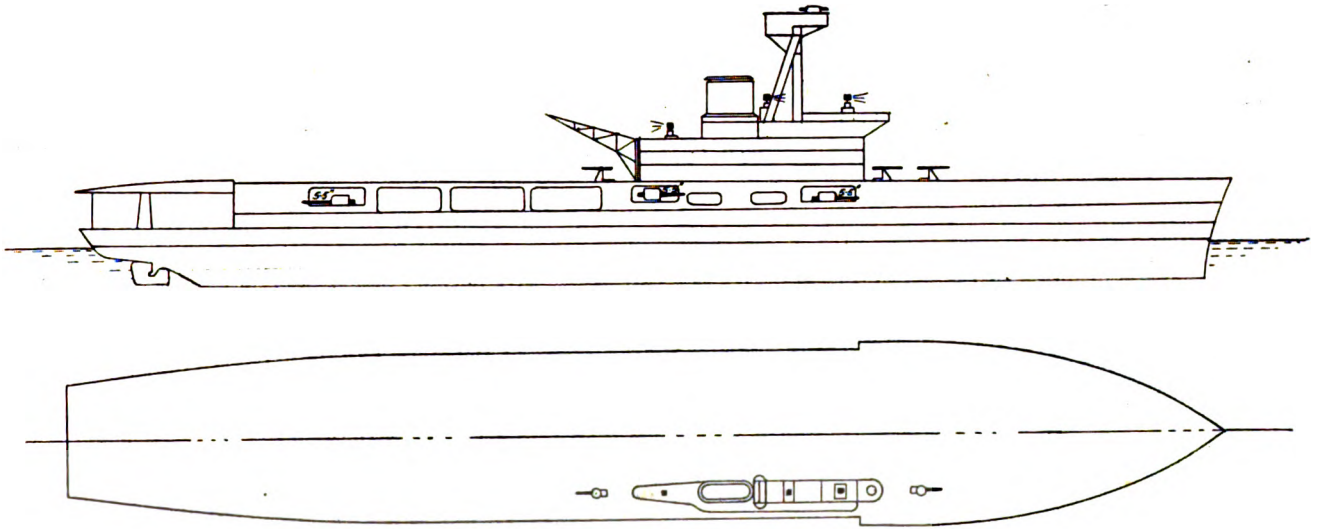
Length (extreme), 786 ft. 6 ins.; 22,450 tons; Speed, 31 knots; Completed, 1917.
Armament, 10—5·5-in.; 6—4-in. A.A.; 4—3-pr.; 4—2-pr.; 4 M.; 10 L.

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GREAT BRITAIN.

AIRCRAFT CARRIER.

Hermes.



Length (extreme), 599 ft. 6 ins.; 10,850 tons; Speed, 25 knots; Completed **1924.**

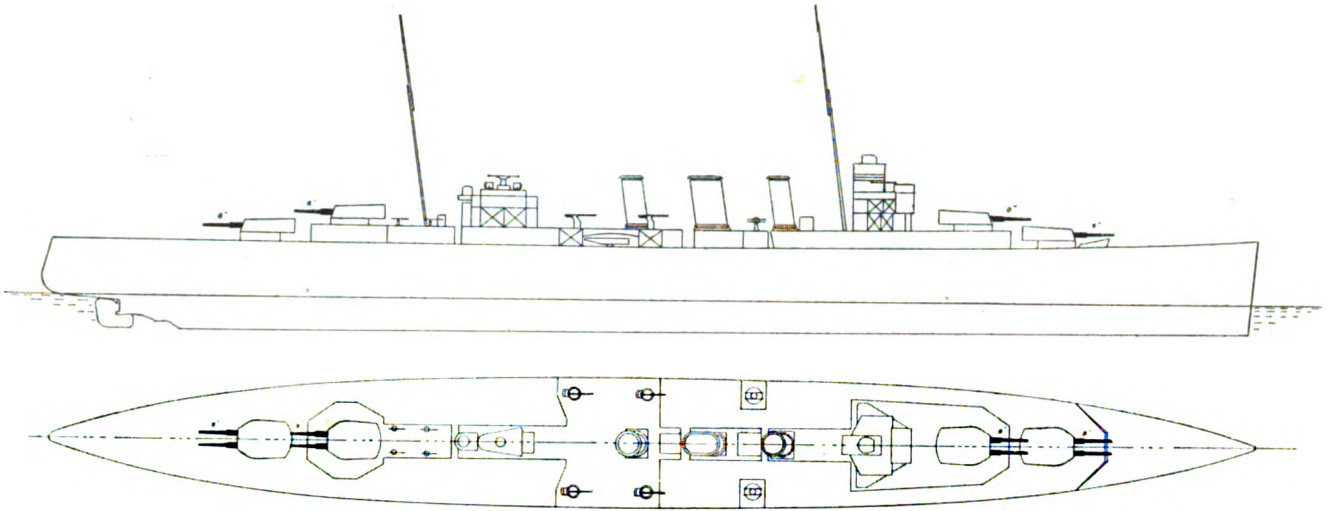
Armament, 6—5·5-in.; 3—4-in. A.A.; 4—3-pr.; 2—2-pr.; 4 M.; 10 L.

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GREAT BRITAIN.

CRUISERS.

Kent. Berwick. Cumberland. Suffolk. Cornwall. Australia.* Canberra.*



Length (extreme), 630 ft. ; B.P., 590 ft. ; 10,000 tons ; Speed, 32 knots.
Armament, 8—8-in. ; 4—4-in. A.A. ; 4—3-pr. ; 4—2-pr. Pom Poms ; 4 M. ; 8 L. ; 2 Q.R. torpedo tubes.

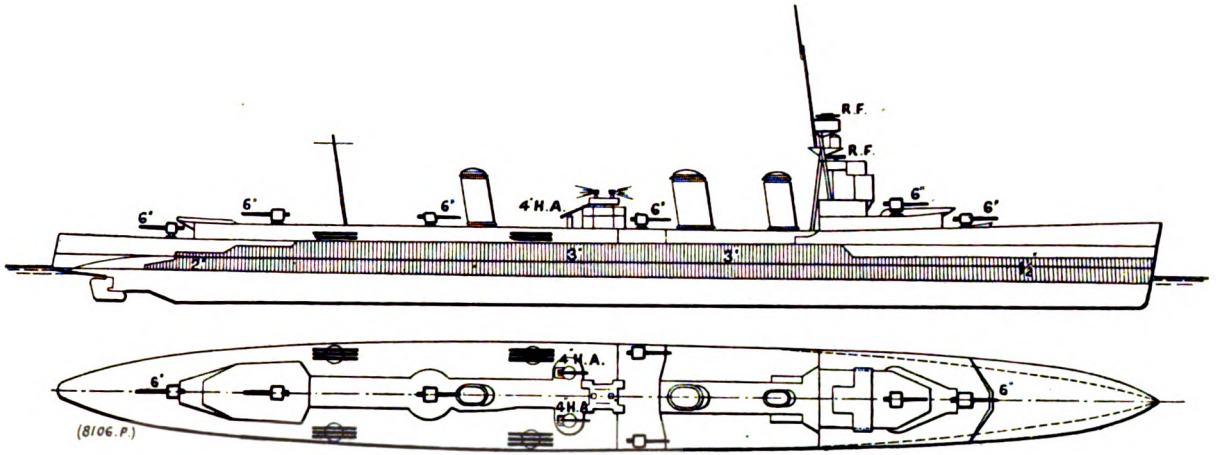
*** H.M. Australian Navy.**

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GREAT BRITAIN.

LIGHT CRUISERS.

Emerald. **Enterprise.**



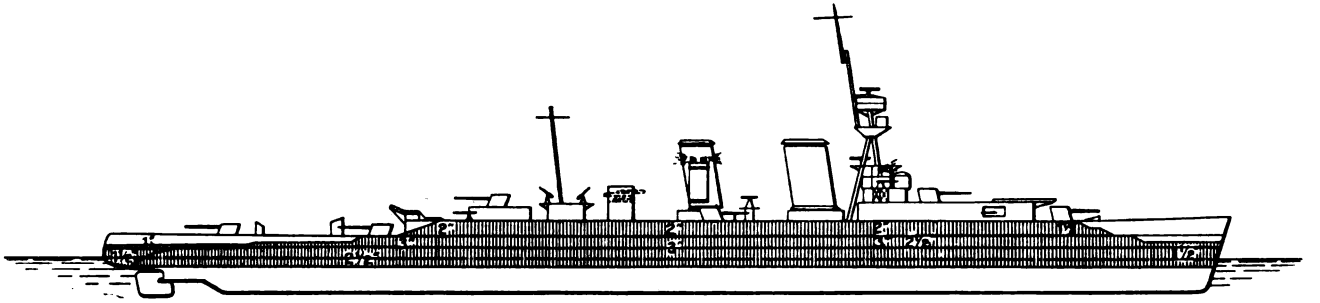
Length (extreme), 570 ft.; Length B.P., 535 ft.; 7,100 tons; Speed, 33 knots.
Armament, 7—6-in.; 3—4-in. A.A.; 4—3-pr.; 2—2-pr. Pom Pom.; 2 M.; 8 L.

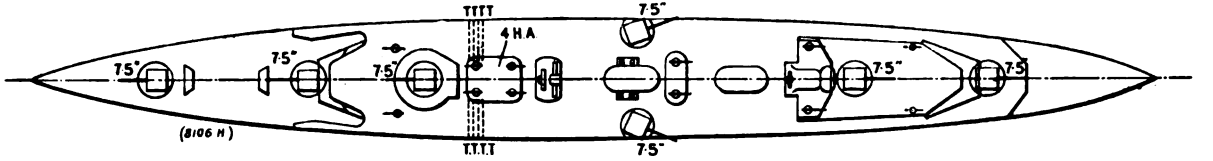
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GREAT BRITAIN.

LIGHT CRUISERS.

Effingham. Hawkins. Frobisher. Vindictive.*





Length (extreme), 605 ft.; Length B.P., 565 ft.; 9,860 tons; Speed, 30 knots.
Armament, 7—7·5-in.; 3—4-in. A.A.; 4—3-pr.; 2 M.; 8 L.
Hawkins has 4—4-in. A.A. and two 2-pr. Pom Poms.

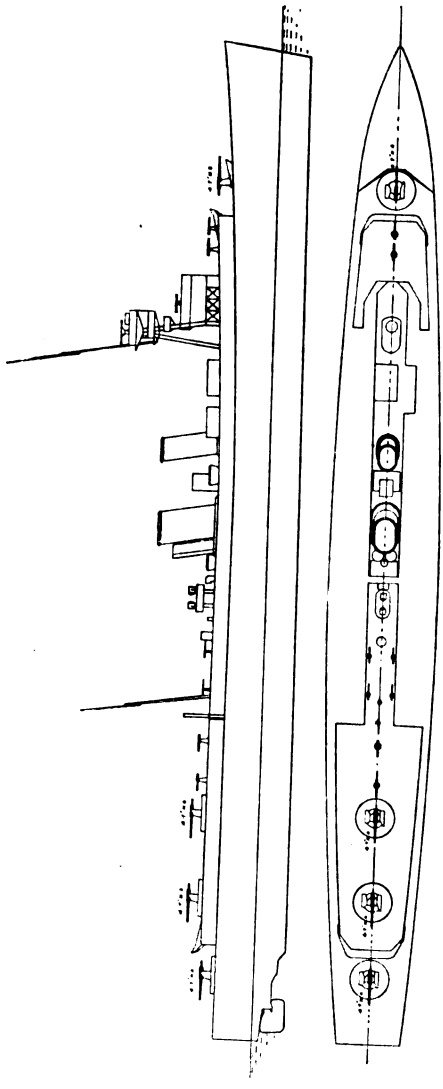
* Vindictive has a catapult mounted forward of the bridge, and for this the raised 7·5-in. gun forward has been removed.

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GREAT BRITAIN.

CRUISER MINE-LAYER

Adventure.



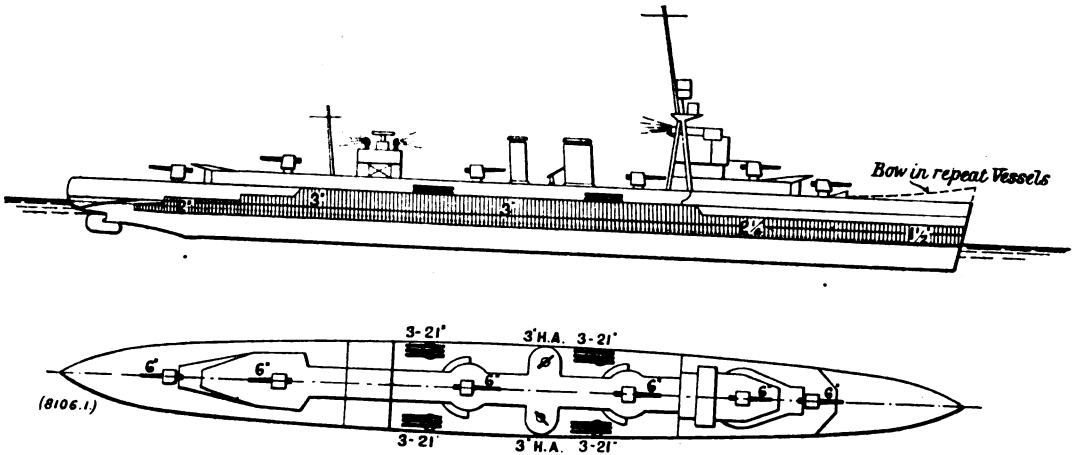
Length (extreme), 521 ft.; Length, B.P., 500 ft.; 6,740 tons; Speed, 27½ knots.
Armament, 4—4·7-in. A.A.; 4—3-pr.; 2 M.; 8 L.

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GREAT BRITAIN.

LIGHT CRUISERS. D CLASS.

Despatch. Diomede. Danae. Dauntless. Dragon. Delhi. Dunedin. Durban.



Length, 445 ft.; 4,850 tons; Speed, 29 knots;
Armament, 6—6-in.; 3—4-in. A.A.; 4—3-pr.; 2 M.; 8 L.

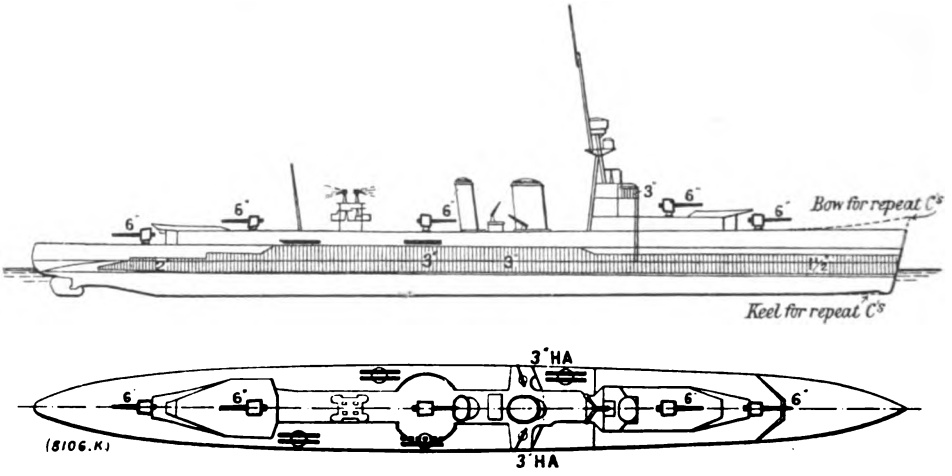
Diomede and Dunedin are now attached to the New Zealand Division.

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GREAT BRITAIN.

LIGHT CRUISERS.

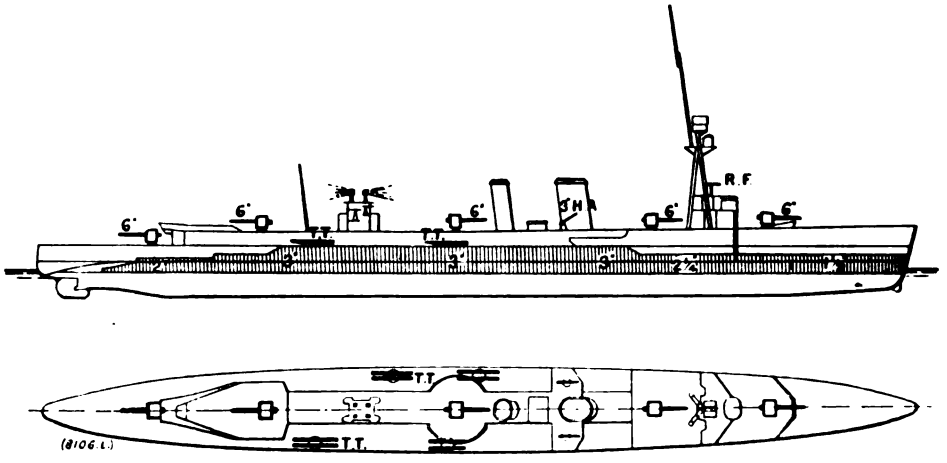
Ceres. **Curacoa.** **Curlew.** **Cardiff.** **Coventry.**
***Cairo.** ***Cape Town.** ***Carlisle.** ***Colombo.** ***Calcutta.**



Length (extreme), 450 ft. (451 ft. 6 ins. Repeat Vessels); Length B.P., 425 ft.; 4,290 tons; Repeat vessels, 4,200 tons; Speed, 29 knots; Completed, 1917–18 (Repeat Vessels, 1918–22).
Armament, 5—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 4 above-water D.R. torpedo tubes.
Cardiff has 2—3-pr.
*** Repeat vessels.**

LIGHT CRUISERS.

Caledon. **Calypso.** **Caradoc.**
***Centaur.** **Concord.**



*** These Plans apply to the above-named ships, but there are differences in detail, as stated.**

Caledon, Calypso, Caradoc — Length (extreme), 450 ft.; Length B.P., 425 ft.; 4,180 tons; Speed, 29 knots; Completed, 1917. Armament, 5—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 2 M.; 8 L.; and 4 above-water D.R. torpedo tubes.

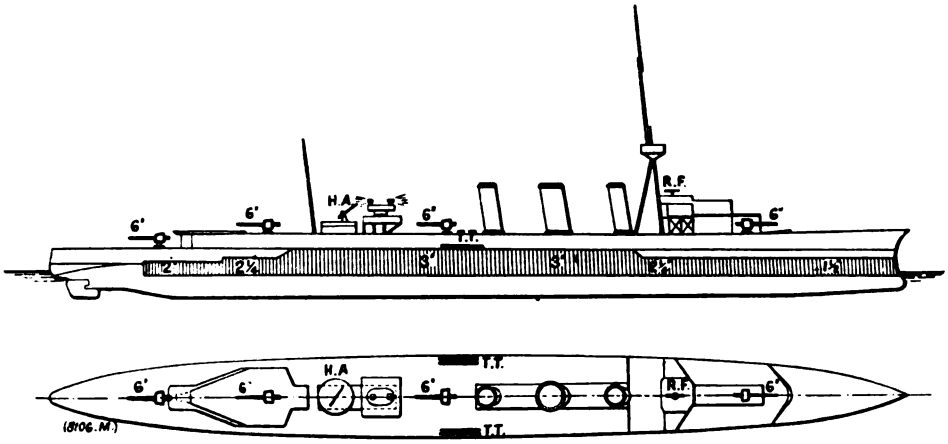
Centaur, Concord — Length (extreme), 446 ft.; Length B.P., 420 ft.; 4,120 tons; Speed, 29 knots; Completed, 1916. Armament, 5—6-in. (Centaur 4—6-in.); 2—3-in. H.A.; 2—3-pr.; 2—2-pr. Pom Poms; 2 M.; 4 L.; and 2 submerged torpedo tubes.

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GREAT BRITAIN.

LIGHT CRUISERS.

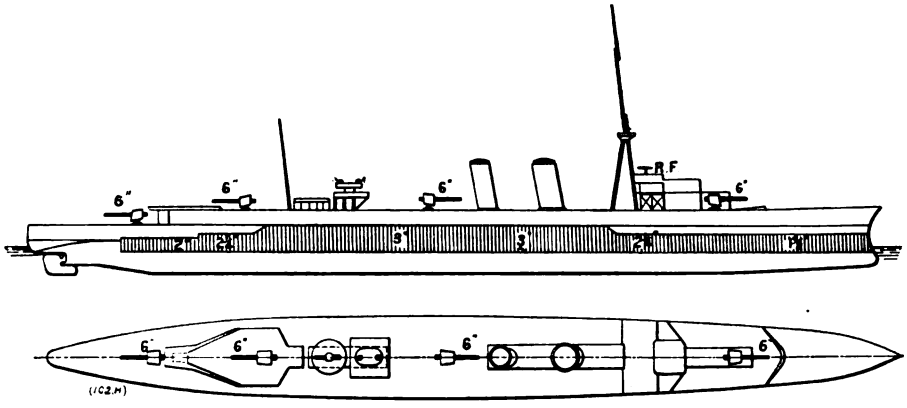
Conquest. Carysfort. Cleopatra. Comus.



Conquest, Carysfort, Cleopatra, Comus — Length (extreme), 446 ft.; Length B.P., 420 ft.; 3,895 tons; Speed, 29 knots; Completed, 1915. Armament, 4—6-in. (Conquest 3—6-in.); 2—3-in. A.A.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 above-water D.R. torpedo tubes. (Comus, Carysfort, and Cleopatra have 4—3-pr.)

LIGHT CRUISERS.

Cambrian. Canterbury. Constance. Castor. Champion. Calliope.



Length (extreme), 446 ft. 6 ins.; Length B.P., 420 ft.; 3,920 tons; Speed, 29 knots; Completed, 1915.

Cambrian, Canterbury, Constance, Castor — Armament, 4—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged torpedo tubes.

Champion — Armament, 4—6-in.; 1—3-in. A.A.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged torpedo tubes; 2 above-water torpedo tubes.

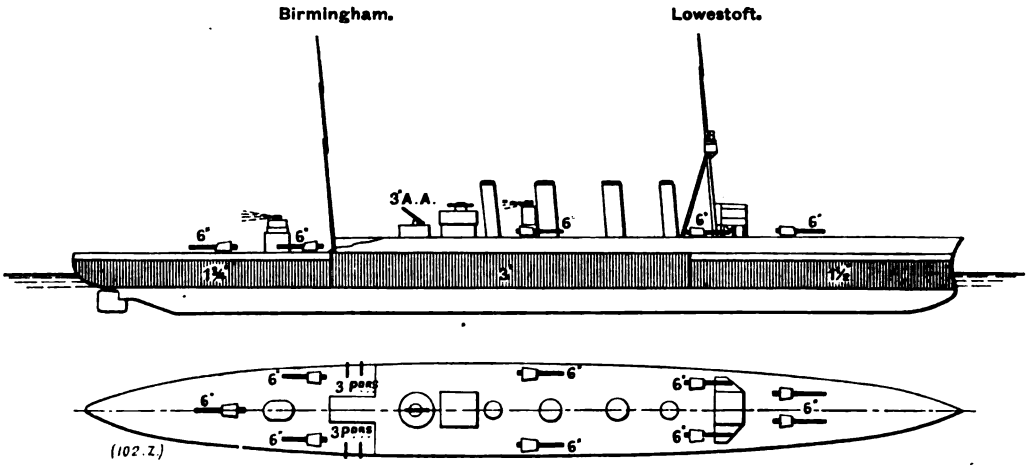
Calliope — Armament, 4—6-in.; 2—3-in. A.A.; 4—3-pr. 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged torpedo tubes.

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GREAT BRITAIN.

LIGHT CRUISERS.

Birmingham. **Lowestoft.**

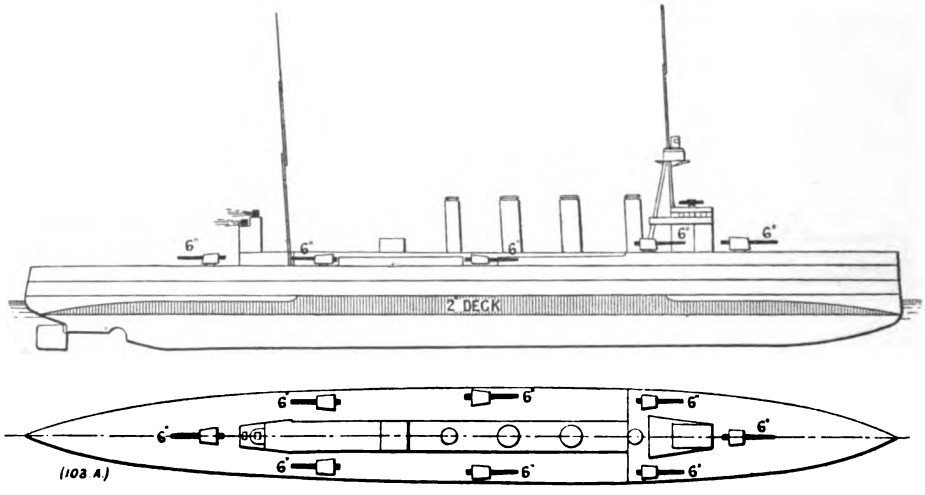


Length (extreme), 450 ft.; Length B.P., 430 ft.; 5,120 tons; Speed, 25½ knots; Completed, 1914.

Birmingham, Lowestoft — Armament, 9—6-in.; 1—3-in. A.A.; 4—3-pr.; 1—2-pr. Pom Pom; 2 M.; 8 L.; 2 submerged torpedo tubes.

LIGHT CRUISERS.

Dartmouth **Yarmouth.**



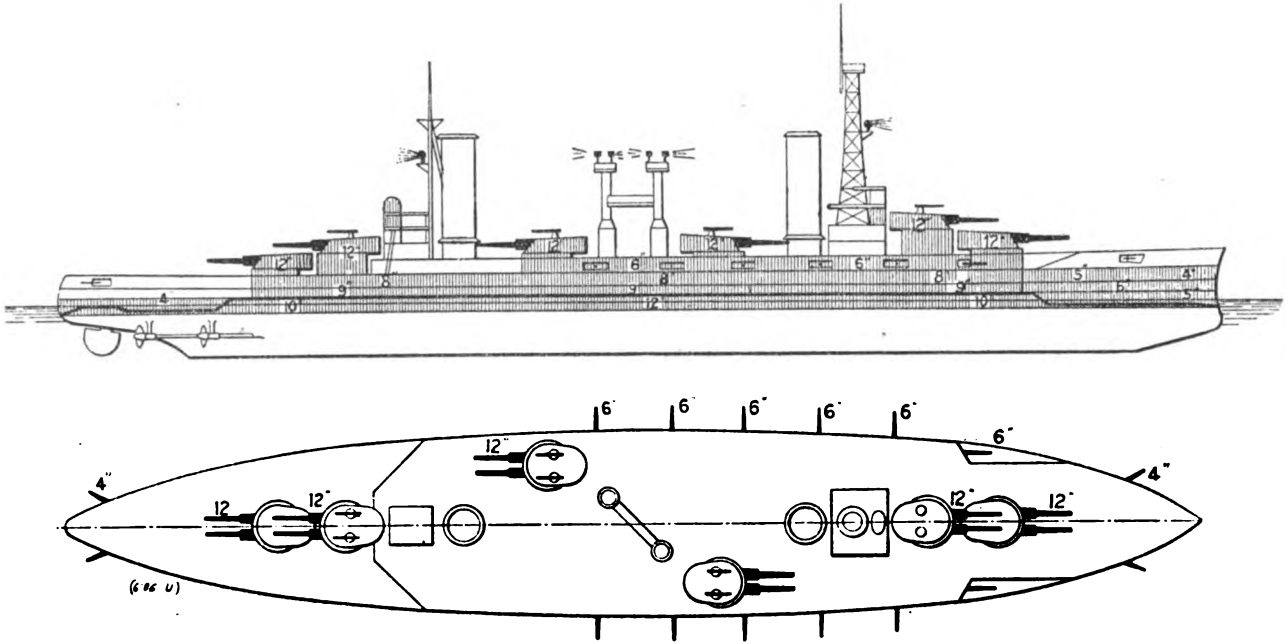
Length (extreme), 453 ft.; Length B.P., 430 ft.; 4,860 tons; Speed, 25½ knots; Completed, 1911-12.
Armament, 8—6-in.; 1—3-in. A.A.; 4—3-pr.; 2 M.; 8 L.; 2 submerged torpedo tubes.

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ARGENTINE.

BATTLESHIPS:

Moreno. **Rivadavia.**



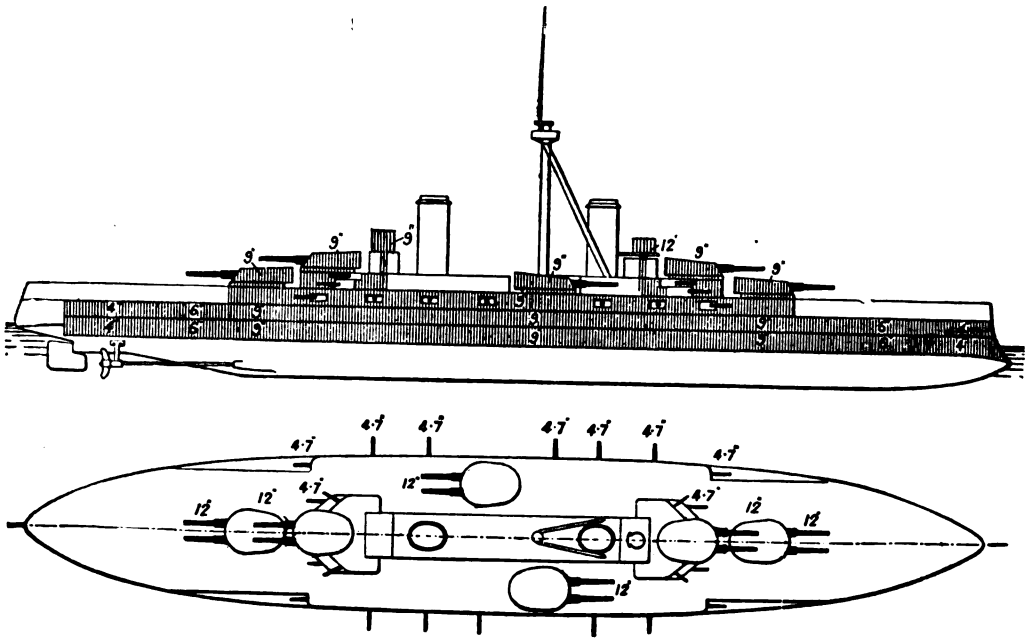
Length (extreme), 585 ft. ; Length on W.L., 575 ft. ; 27,940 tons ; Speed, 22 knots ; Completed, 1914-15.
Armament, 12—12-in. ; 12—6-in. ; 4—3-in. A.A. ; 4—3-pr.

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BRAZIL.

BATTLESHIPS

Minas Geraes. **São Paulo.**



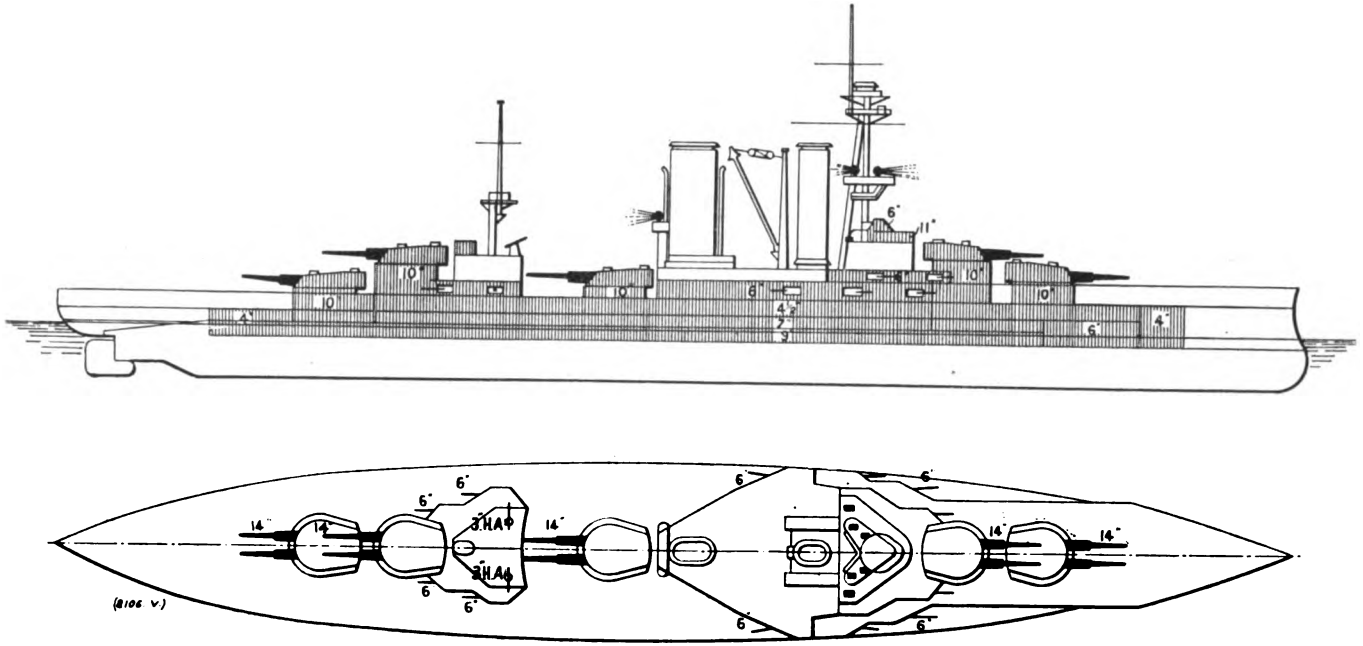
Length (extreme), 543 ft.; Length B.P., 500 ft.; 19,281 tons; Speed, 21·5 knots; Completed, 1909, 1910.
Armament, 12—12-in.; 22—4·7-in.; 8—3-pr.; 2—3-in. A.A.
Overhauled and refitted at Brooklyn Navy Yard, 1921-22, and A.A. guns installed.

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CHILE.

BATTLESHIP.

Almirante Latorre (*formerly* **H.M.S. Canada**)

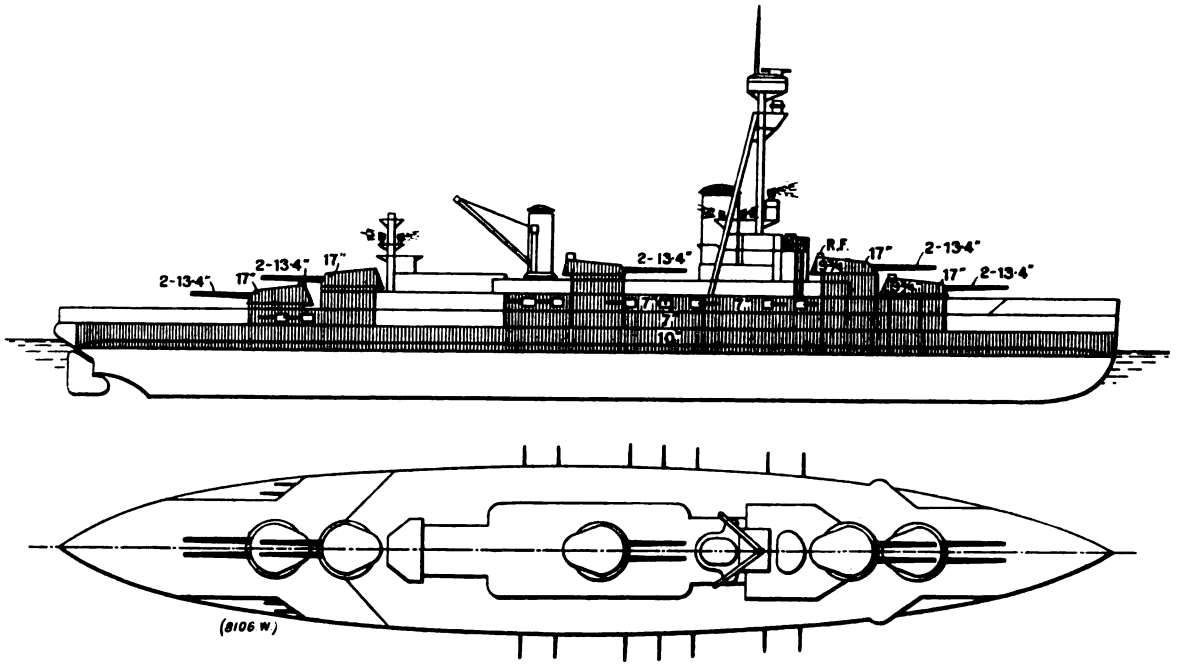


Length (extreme), 661 ft.; Length B.P., 625 ft.; 28,000 tons; Speed, 23 knots; Completed, 1915.
Armament, 10—14-in.; 14—6-in.; 2—3-in. A.A.; 4—3-pr.

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BATTLESHIPS.

Bretagne. **Lorraine.** **Provence.**



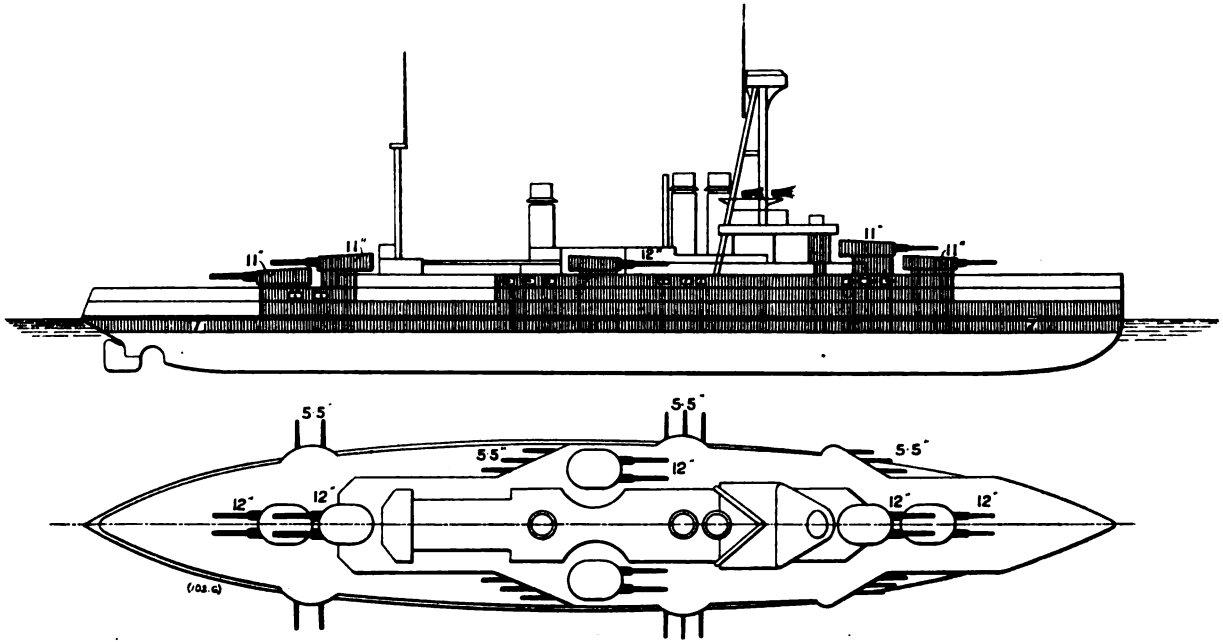
Length (extreme), 544 ft. 6 ins.; 23,128 tons; Speed, 20 knots; Completed, 1915–16; Reconstructed, 1919–20.
Armament, 10—13·4-in.; 18—5·5-in.; 8—3-in. A.A.; 2—1-pr. Provence has 4—3-in. A.A. and 4—3-pr. Lorraine has 8—3-in. A.A. and 4—3-pr.
NOTE.—Bretagne as above, Provence and Lorraine have a main topmast rigged.

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FRANCE.

BATTLESHIPS.

Jean Bart. Courbet. Paris.



Length (extreme), 544 ft. 6 ins. ; Length B.P., 541 ft. 4 ins. ; 23,128 tons ; Speed, 20 knots ; Completed, 1913-14. Large alterations, 1924.
Armament, 12—12-in. ; 22—5·5-in. ; 4—14-pr. A.A. ; 2—3-pr. ; 2—1-pr. (Courbet has 3—3-pr.)

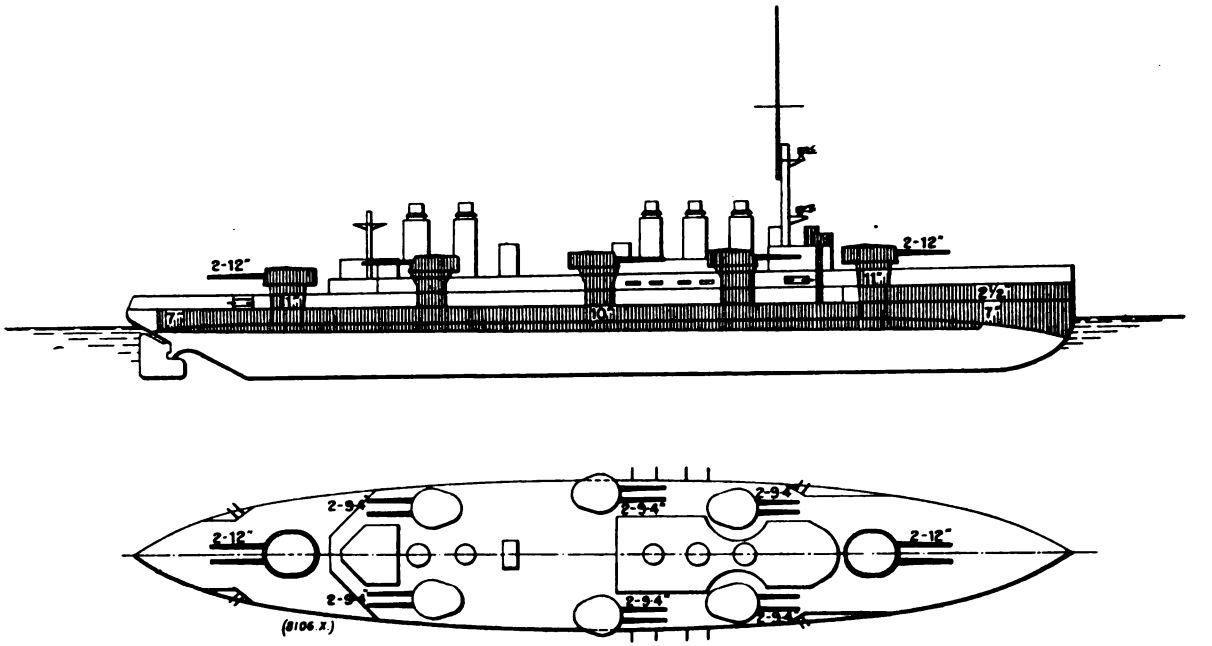
NOTE.—Courbet and Jean Bart have only one large funnel forward instead of the two smaller ones in Paris.

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FRANCE.

BATTLESHIPS.

Condorcet. **Diderot.** **Voltaire.**



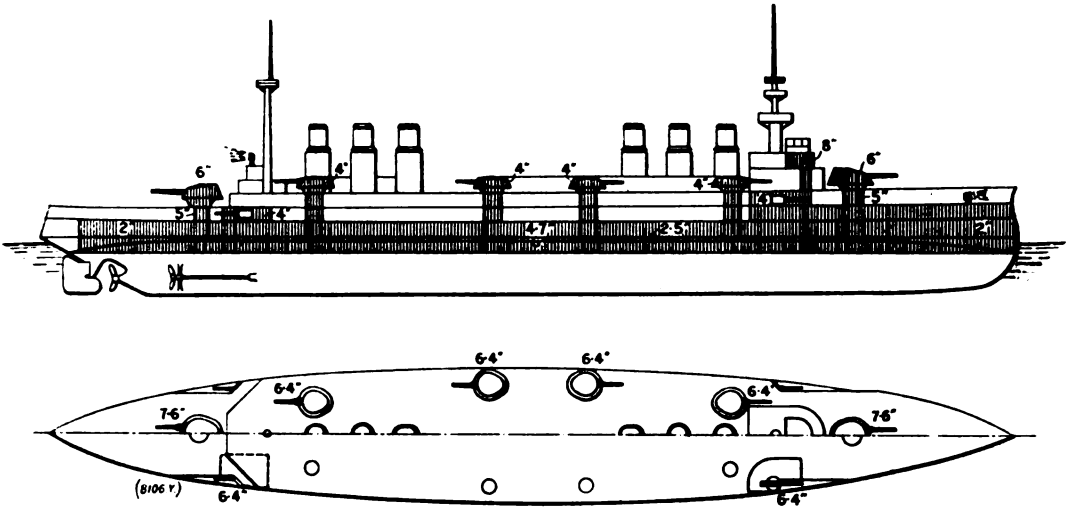
Length (extreme), 481 ft.; Length W.L., 475 ft. 9 ins.; Speed, 19¼ knots; 18,592 tons; Completed, 1911.
Armament, 4—12-in.; 12—9·4-in.; 4—3-pr. A.A.; 2—1-pr.

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FRANCE.

ARMOURED CRUISERS

Ernest Renan. **Jules Michelet.**



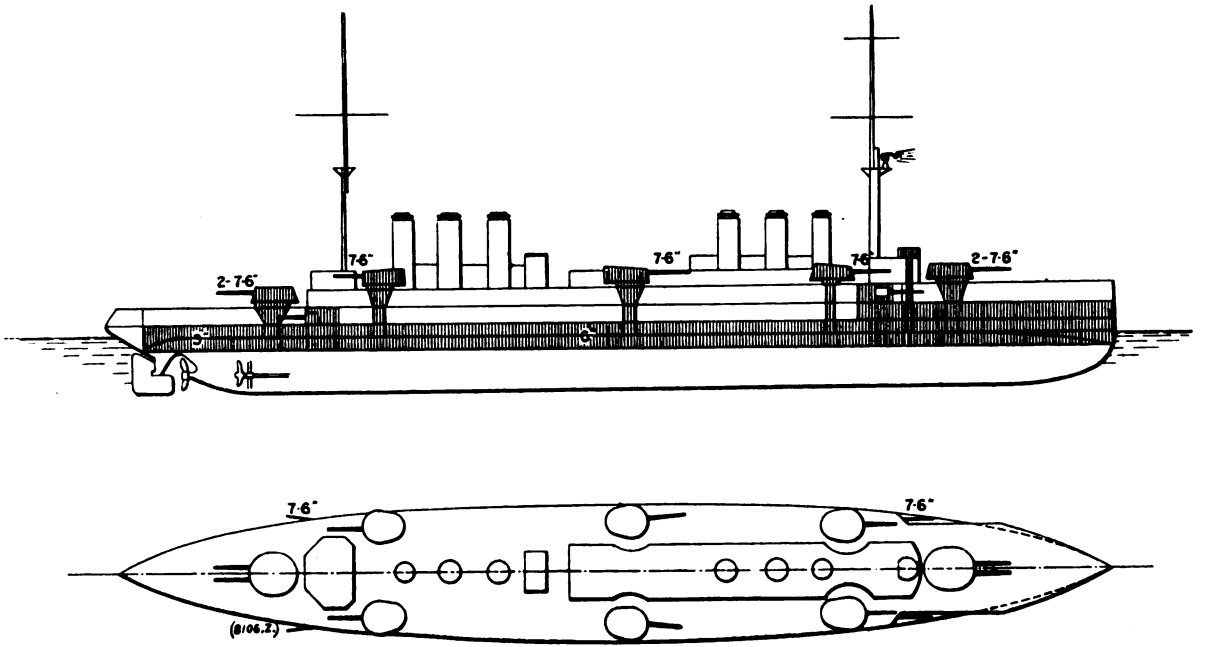
Length, 521 ft. 7 ins. and 489 ft.; 13,500 tons and 12 400 tons; Speed, 23 knots and 22 knots; Completed, 1909 and 1908. Armament, 4—7·6-in., 12—6·5-in.; and smaller.

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FRANCE.

ARMOURED CRUISERS.

Edgar Quinet. **Waldeck Rousseau**



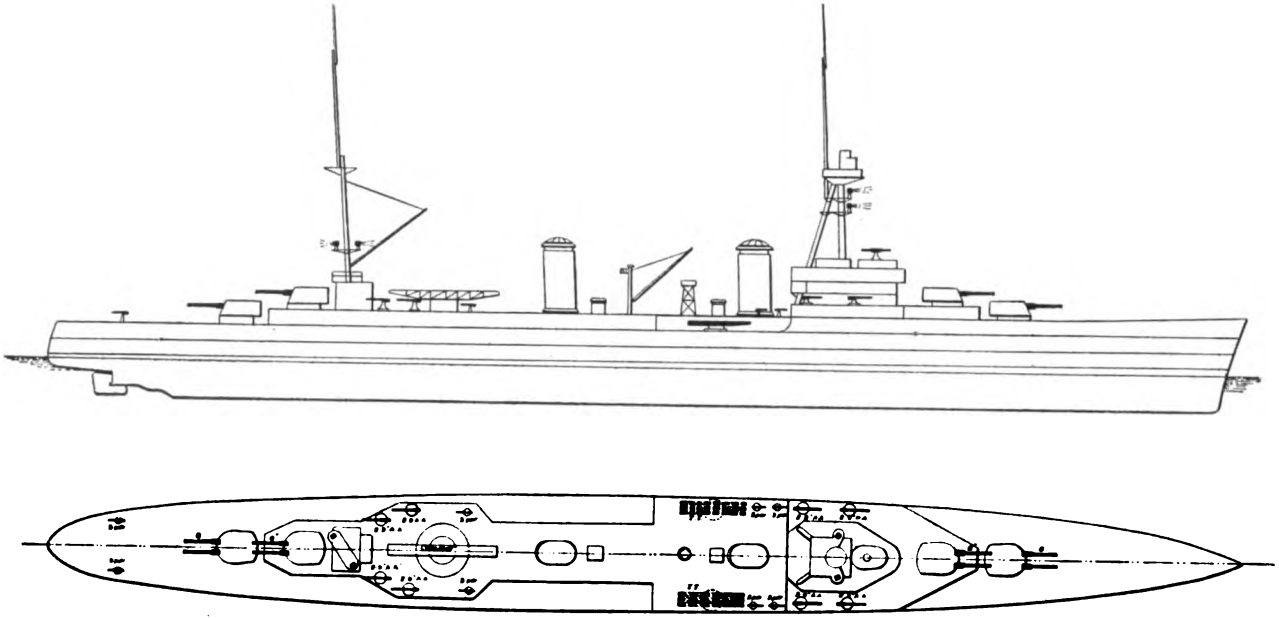
Length (extreme), 521 ft. 4 ins.; Length W.L., 515 ft.; Speed, 23 knots; 13,828 tons; Completed, 1911.
Armament, 14—7·6-in.; 6—3-in.; 2—3-in. A.A.; 2—3-pr.

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FRANCE.

CRUISERS.

Duquesne. **Tourville.**



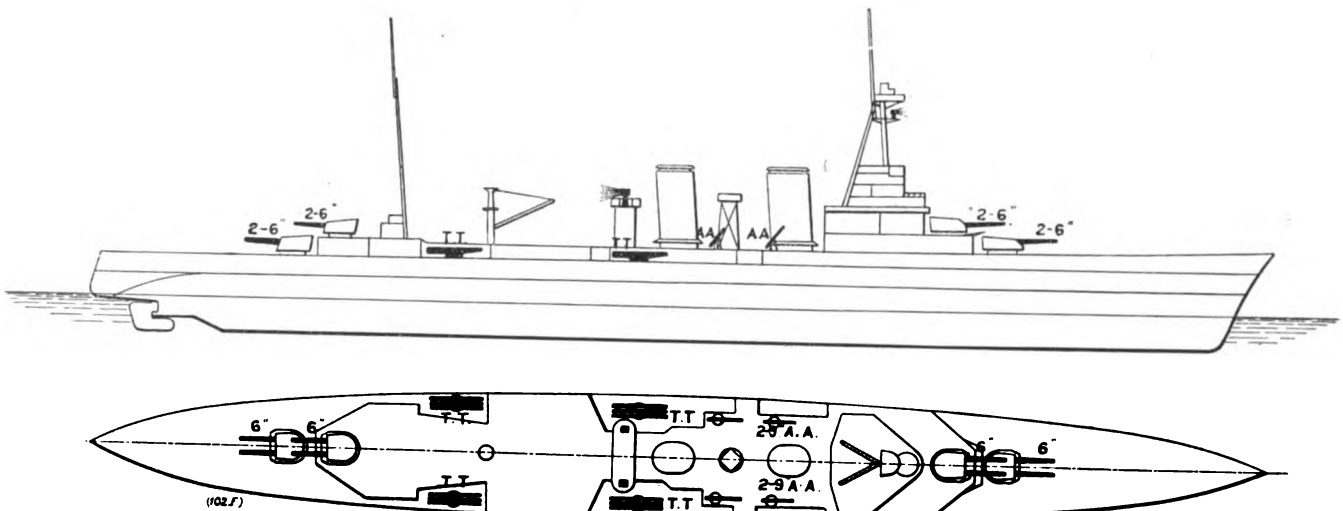
Length (extreme), 626 ft. 8 ins.; Length B.P., 607 ft.; 10,000 tons; Speed, 34 knots. Completed, 1928.
Armament, 8—8-in., 8—3-in. A.A.; 8—3-pr.; 2—triple T.T.'s. Fitted with a catapult. Carries 2 seaplanes.

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FRANCE.

LIGHT CRUISERS.

La Motte Piquet. Duguay-Trouin. Primauguet.



Length (extreme), 594 ft. 10 ins.; Length B.P., 575 ft.; 7,870 tons; Speed, 34 knots. First two ships of class laid down in August, 1922, and January, 1923. Completed 1926.

Armament, 8—6·1-in.; 4—3 in. A.A.; 2—3-pr.; 4 triple torpedo tubes (21·7-in. torpedoes) and 1 reconnaissance seaplane.

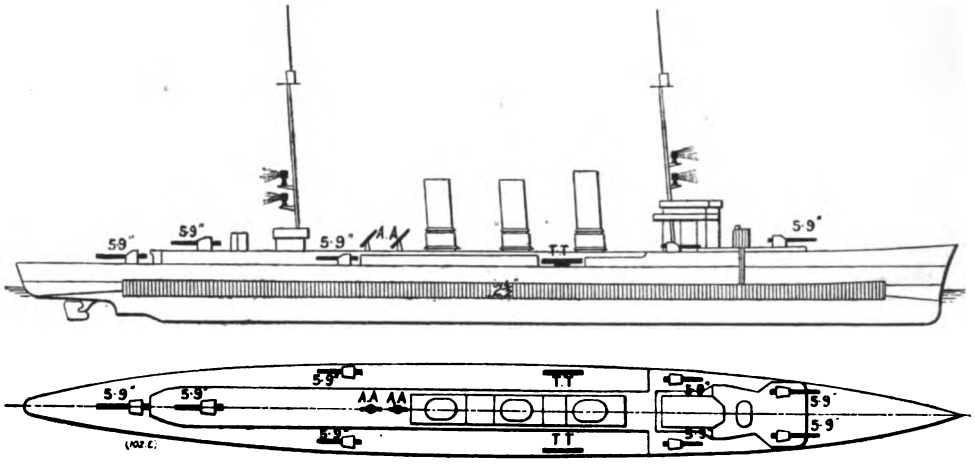
NOTE.—Reported to have protection to magazines.

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FRANCE.

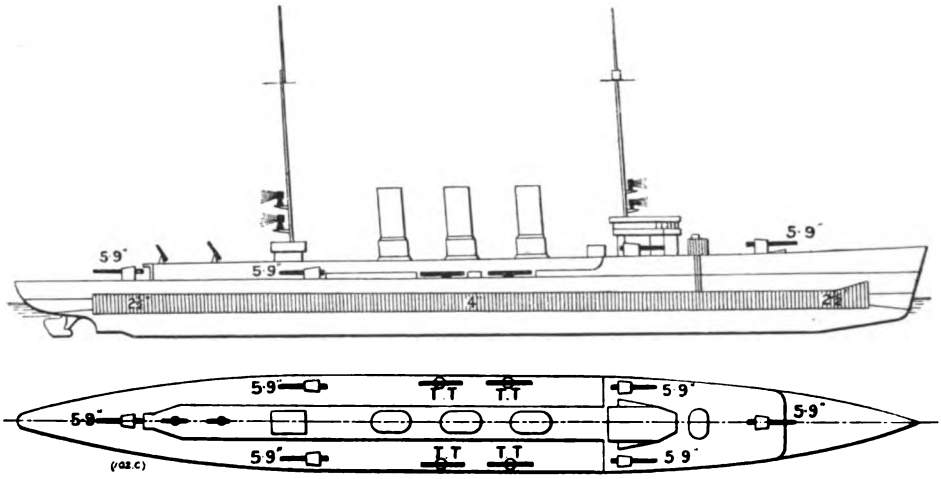
LIGHT CRUISERS.

Metz (*ex-German* Königsberg).



Length (water-line), 489 ft.; 6,100 tons; Speed, 27·5 knots; Completed, 1916.
Armament, 8—5·9-in.; 2—3-in. A.A.; 4 M.; 4 torpedo tubes (2 above water, 2 submerged).

Strasbourg (*ex-German* Regensburg).



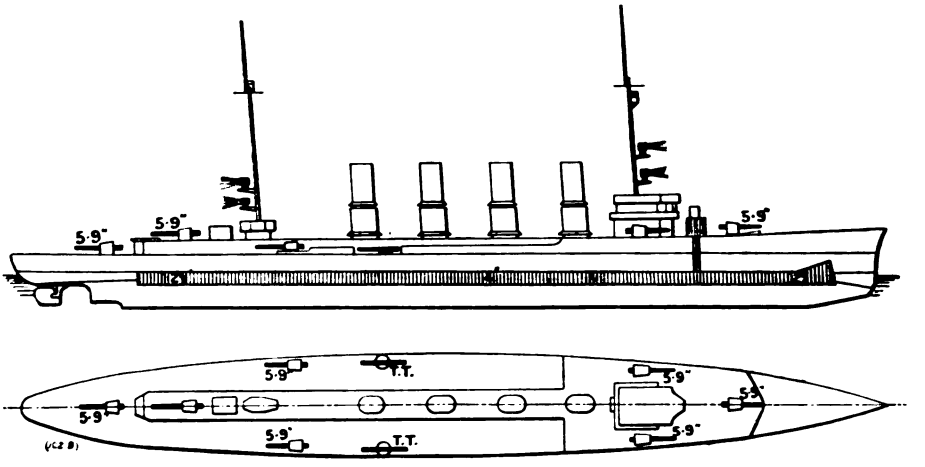
Length (extreme), 468 ft.; Length (water-line), 456 ft.; 5,510 tons; Speed, 27 knots; Completed, 1914.
Armament, 6—5·9-in.; 1—3-in. A.A.; 4 torpedo tubes (19·7-in. torpedoes).

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FRANCE.

LIGHT CRUISER.

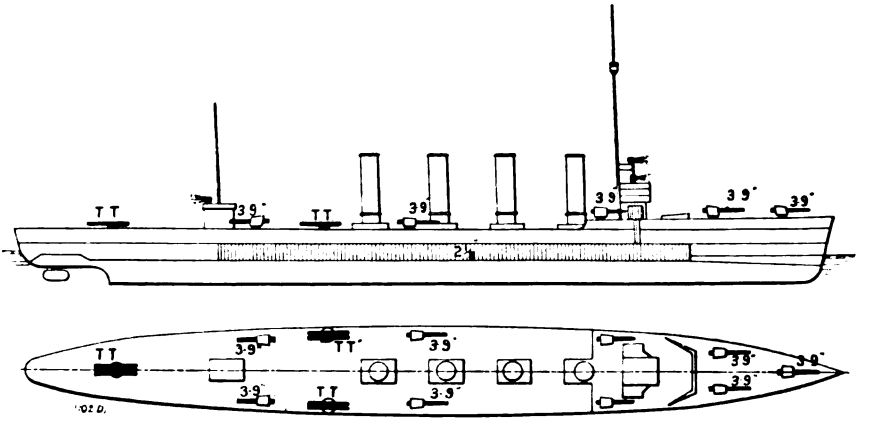
Mulhouse (*ex-German* Stralsund).



Length (water-line), 446 ft. 3 ins. ; 4,480 tons ; Speed, 28·27 knots ; Completed, 1913.
Armament, 7—5·9-in. ; 2—3-in. A.A. ; 2 M. ; 2 torpedo tubes (19·7-in. torpedoes).

LIGHT CRUISER.

Thionville (*ex-Austrian* Novara).



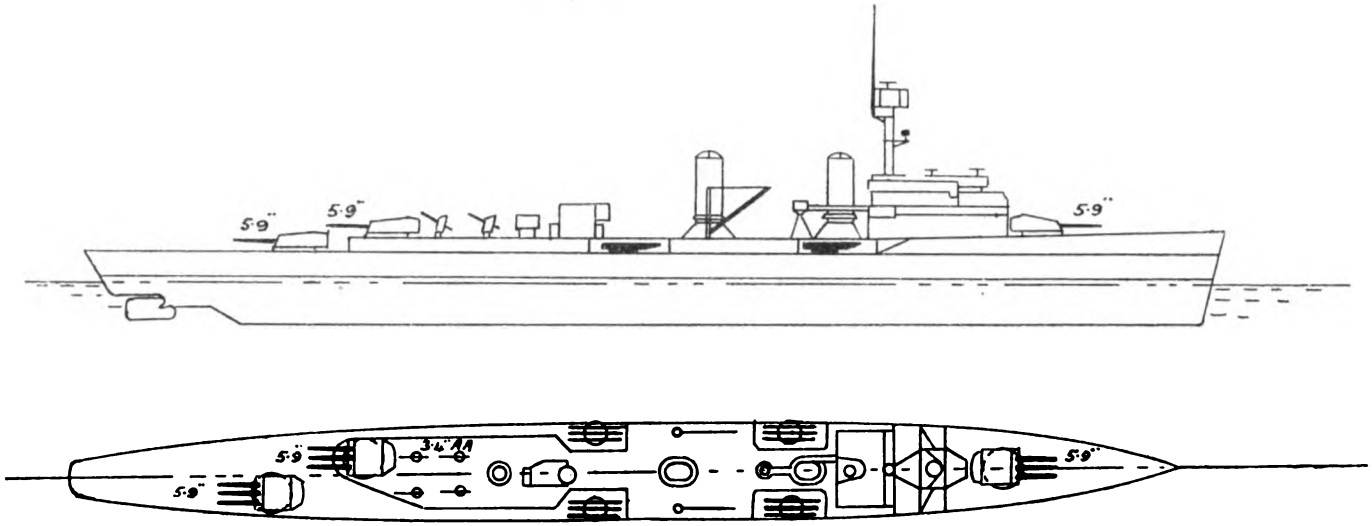
Length (extreme), 428 ft. 6 ins. ; Length (water-line), 410 ft. 9 ins. ; 3,500 tons ; Speed, 27 knots ; Completed, 1914.
Armament, 9—3·9 in. ; 1—3-in. A.A. ; 1 triple and 2 twin above-water torpedo tubes.

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GERMANY.

LIGHT CRUISERS.

Königsberg. **Karlsruhe.**



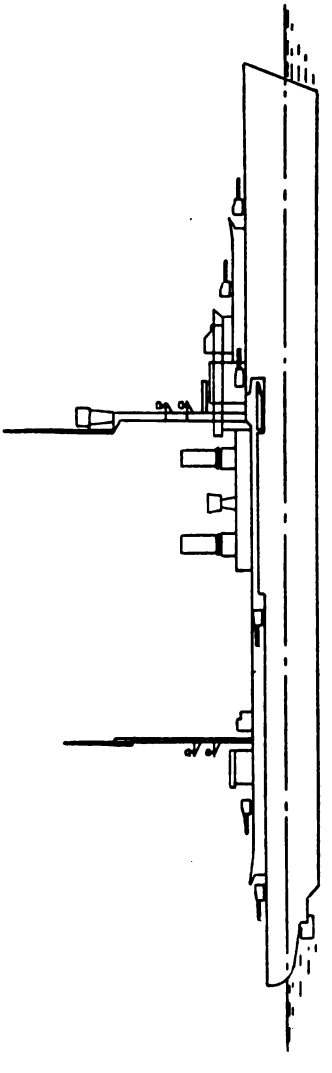
Length (extreme), 570 ft. 10 ins.; 6,000 tons; Speed, 32 knots.
Armament, 9—5·9-in.; 4—3-in. A.A.; 4 triple torpedo tubes.

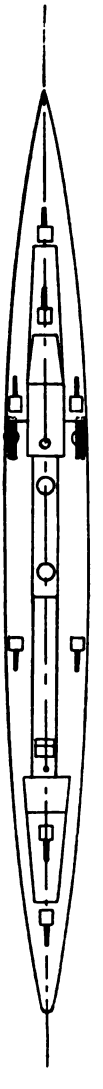
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GERMANY.

LIGHT CRUISER.

Emden.





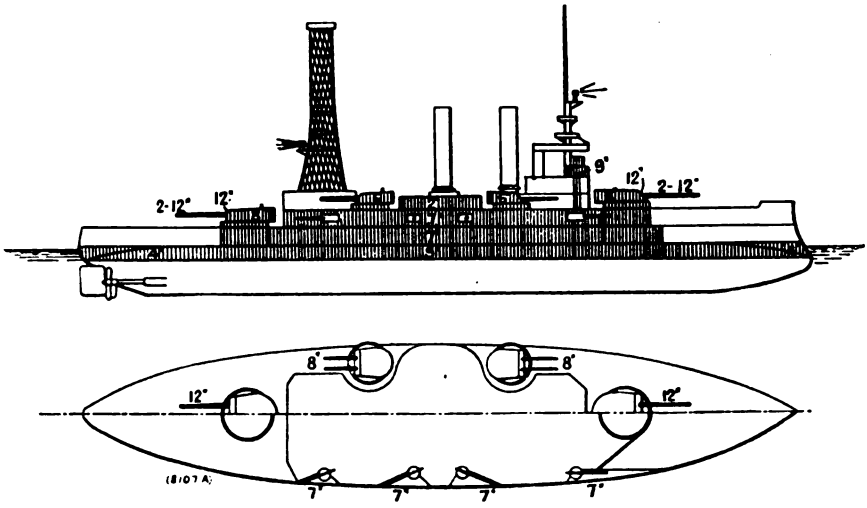
Length (extreme), 510 ft. 2 ins.; 6,000 tons; Speed, 29 knots; Completed, 1925.
Armament, 8—5·9-in.; 8—4-in.; 2 double torpedo tubes.

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GREECE.

BATTLESHIPS.

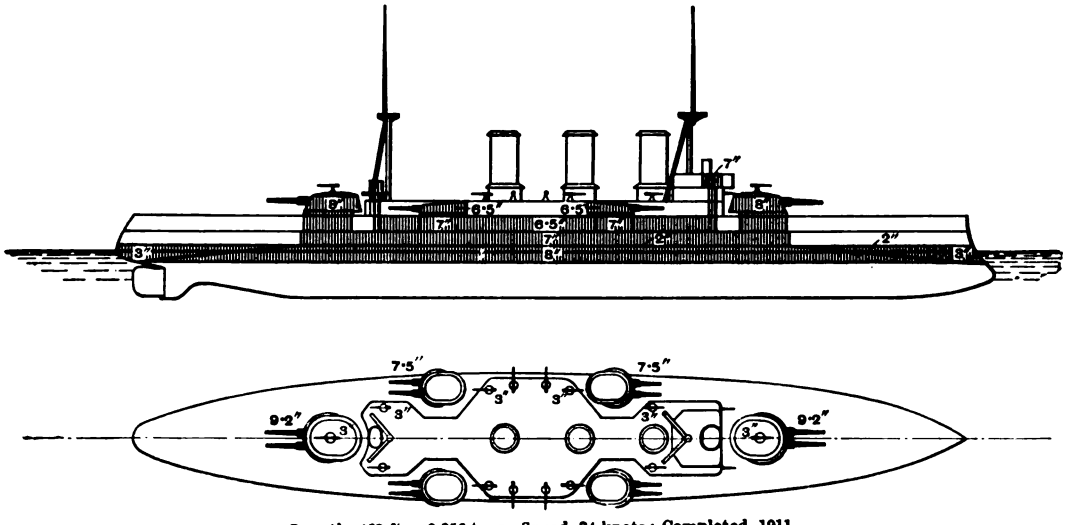
Lemnos (*ex*-Idaho). **Kilkis (*ex*-Mississippi).**



Length, 382 ft. ; 13,000 tons ; Speed, 17·1 knots ; Completed, 1908.
Armament, 4—12-in. ; 8—8-in. ; 8—7-in. ; 8—3 in. ; 2—3-in. A.A. ; 4—6 pr. ; 14 smaller.

ARMOURED CRUISER.

Giorgios Averoff.



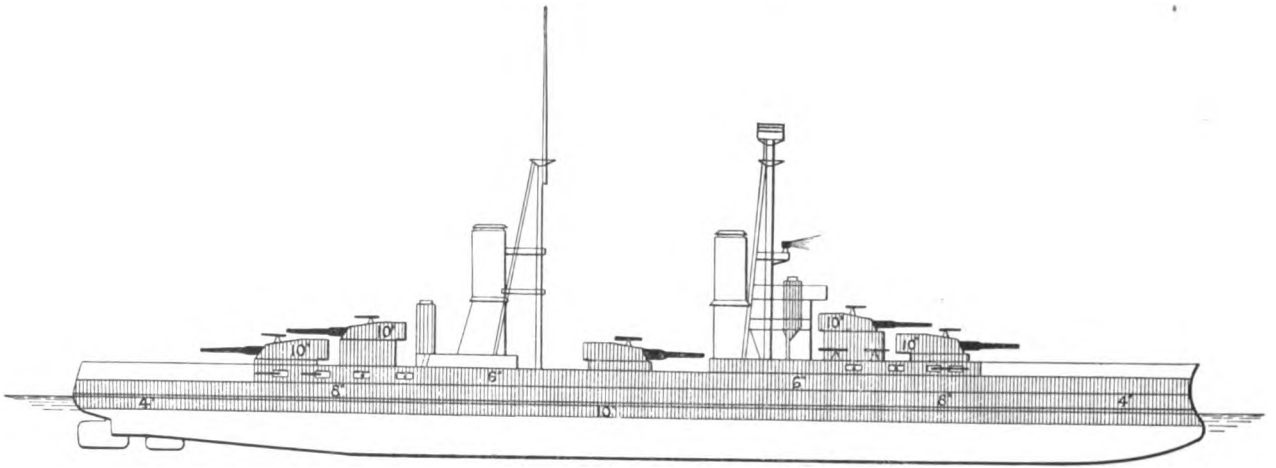
Length, 462 ft. ; 9,956 tons ; Speed, 24 knots ; Completed, 1911.
Armament, 4—9·2-in. ; 8—7·5-in. ; 16—14-pr. ; 2—3-in. A.A. ; 6 smaller.

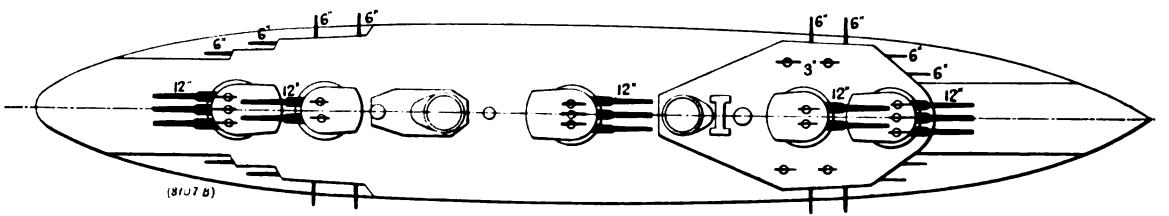
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ITALY.

BATTLESHIPS.

Andrea Doria. **Caio Duilio.**



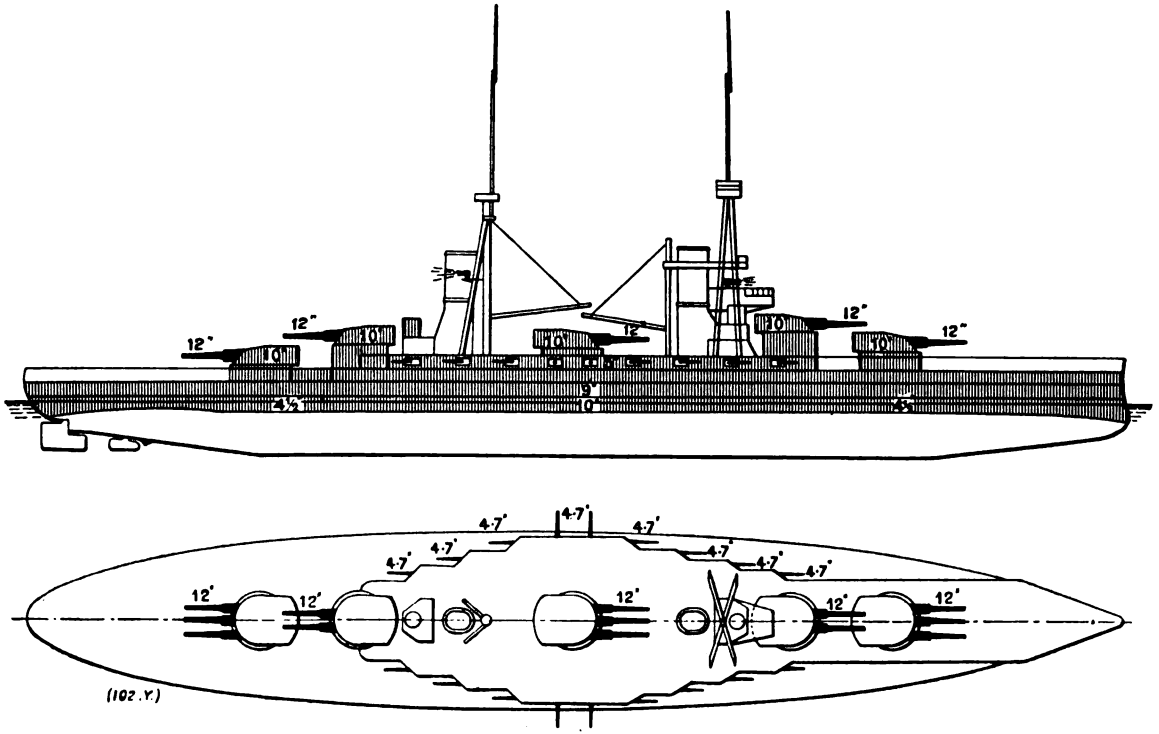


Length (extreme), 575 ft. 9 ins. ; Length B.P., 554 ft. 4 ins. ; Speed, 21 knots ; Completed, 1915.
Armament, 13—12-in. ; 16—6-in. ; 13—14 pr. ; 6—14 pr. A.A. ; 2—2-pr. ; 6 M. ; 4 L.

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ITALY.

Conte di Cavour.* **Giulio Cesare.**



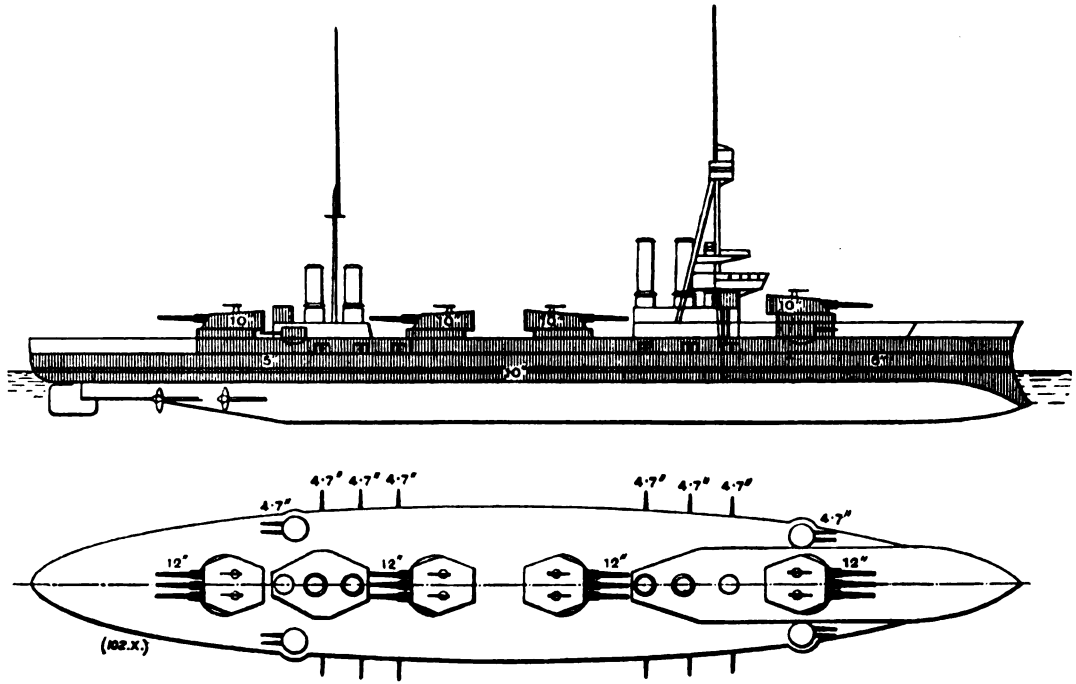
Length (extreme), 575 ft. 9 ins. ; Length B.P., 554 ft. 4 ins. ; Speed, 22 knots ; 22,500 tons ; Completed, 1914-1915.
Armament, 13—12-in. ; 18—4·7-in. ; 13—14-pr. ; 6—14-pr. A.A. ; 2-2-pr.
* A fixed catapult is mounted on port side of Forecastle Deck forward.

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ITALY.

BATTLESHIP.

Dante Alighieri.



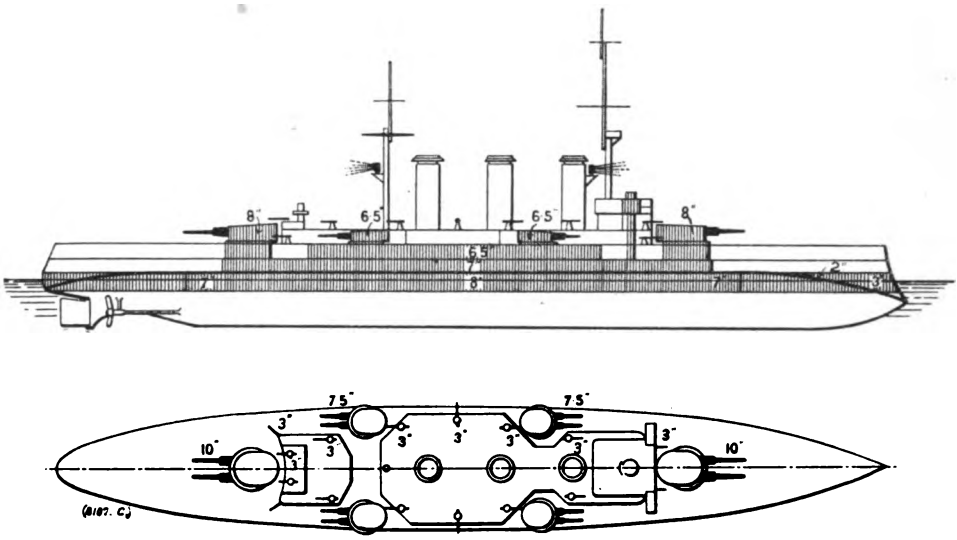
Length (extreme), 549 ft. 6 ins. ; Length B.P., 519 ft. 8½ ins. ; Speed, 23 knots ; 19,250 tons ; Completed, 1912.
Armament, 12—12-in. ; 20—4·7-in. ; 12—14-pr. ; 6—3-in. A.A. ; 2—2-pr.

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ITALY

ARMOURED CRUISER.

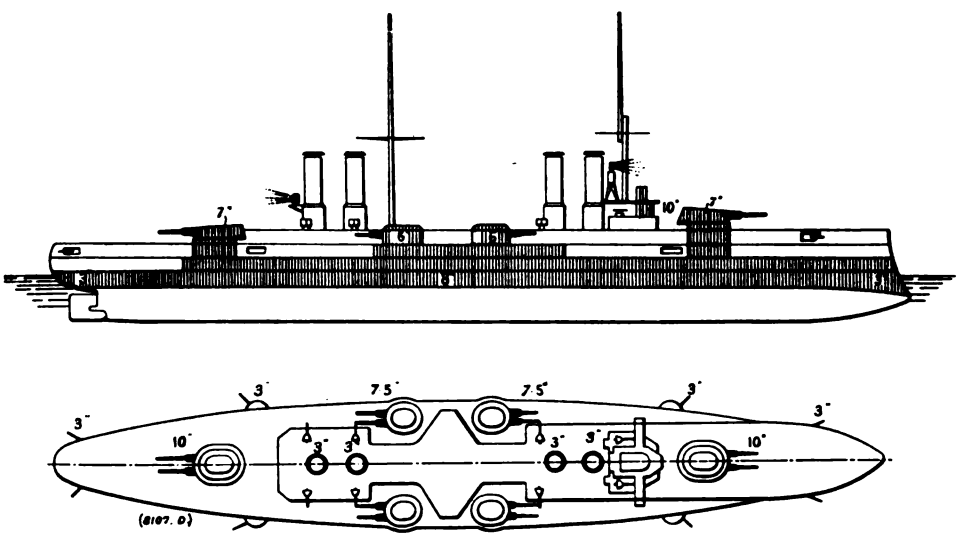
Pisa.



Length (extreme), 460 ft. 11 ins.; Length B.P., 426 ft. 6 ins.; Speed, 23 knots; 10,430 tons; Completed, 1908.
Armament, 4—10-in.; 8—7·5-in.; 14—14-pr.; 6—14-pr. A.A.
Boys' Training Ship.

ARMOURED CRUISERS.

S. Giorgio. **S. Marco.**



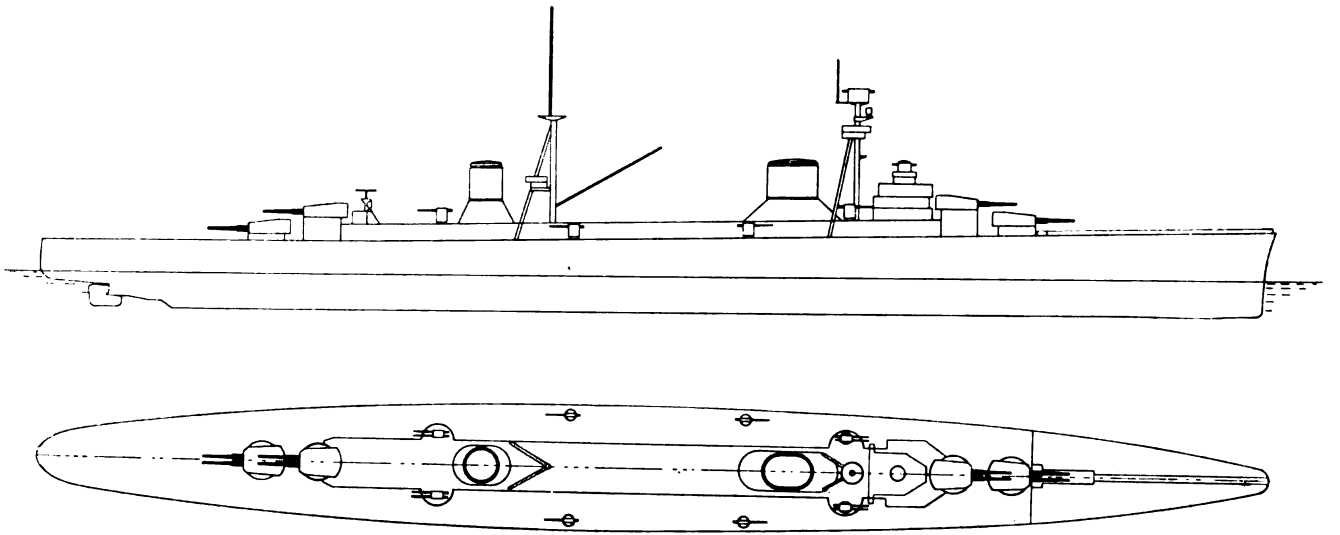
Length (extreme), 462 ft. 2 ins.; Length B.P., 429 ft. 10 ins.;
Speed, 22·5 and 23 knots; 10,000 and 10,920 tons; Completed, 1910.
Armament, 4—10-in.; 8—7·5-in.; 10—14-pr.; 6—14-pr. A.A.

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ITALY.

CRUISERS.

Trento. **Trieste.**



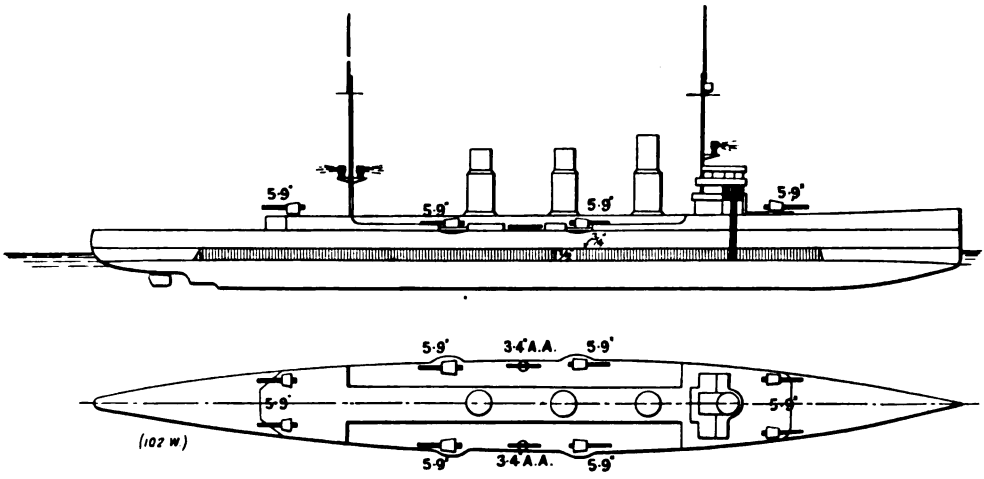
Length (extreme), 640 ft. 9 ins. ; 10,000 tons ; Speed, 35 knots ; Completed 1928.
Armament, 8—8-in., 12—4-in. ; 2 twin T.T. s.

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ITALY.

LIGHT CRUISER.

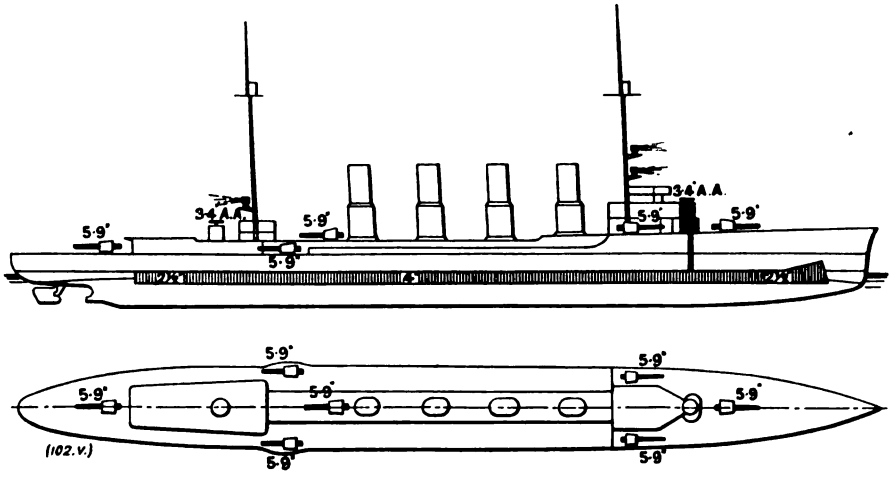
Bari (*ex-German* Pillau).



Length (extreme), 441 ft.; Length B.P., 403 ft.; 4,250 tons; Speed, 27·5 knots; Completed, 1914.
Armament, 8—5·9-in.; 3—3-in. A.A.; 2 above-water torpedo tubes (19·7-in. torpedoes); 120 mines.

LIGHT CRUISER.

Taranto (*ex-German* Strassburg).



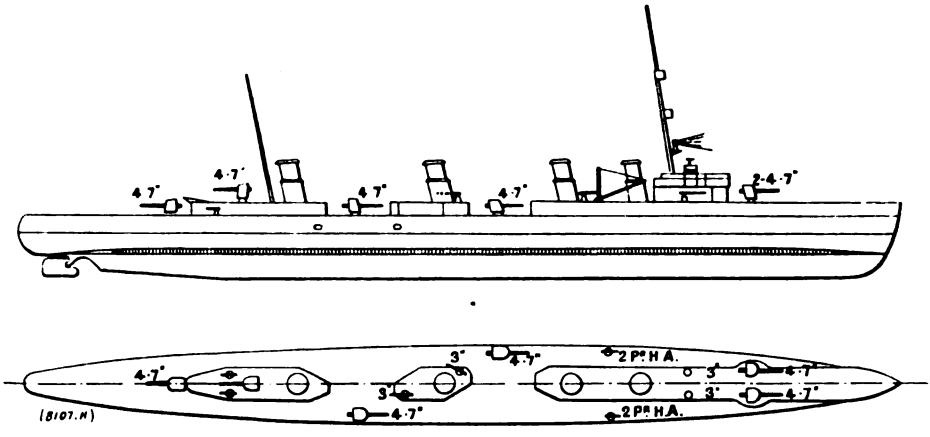
Length (water-line), 446 ft. 3 ins.; 4,840 tons; Speed, 26·9 knots; Completed, 1912.
Armament, 7—5·9-in.; 3—3-in. A.A.; 2 torpedo tubes submerged (19·7-in. torpedoes); 120 mines.

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ITALY.

LIGHT CRUISERS.

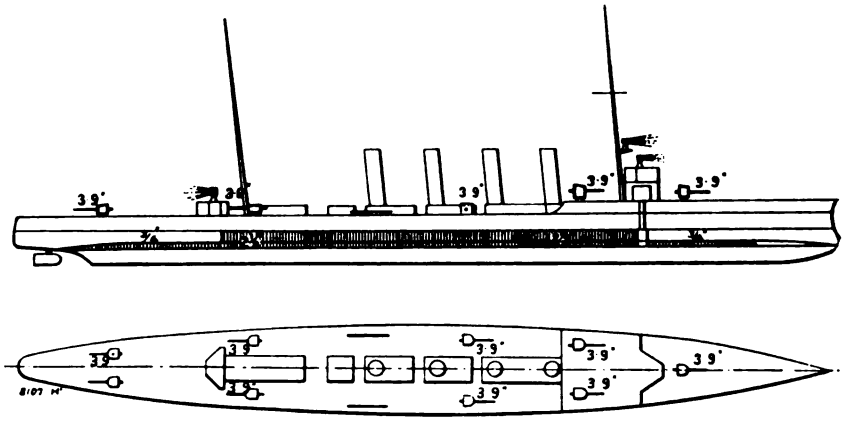
Nino Bixio.



Length (extreme), 460 ft.; Length B.P., 430 ft.; Speed, 28 knots; 3,520 tons; Completed, 1914.
Armament, 6—4·7-in.; 6—14-pr.; 2—2-pr. A.A.; 2 above-water 18-in torpedo tubes; 120 mines.

LIGHT CRUISERS.

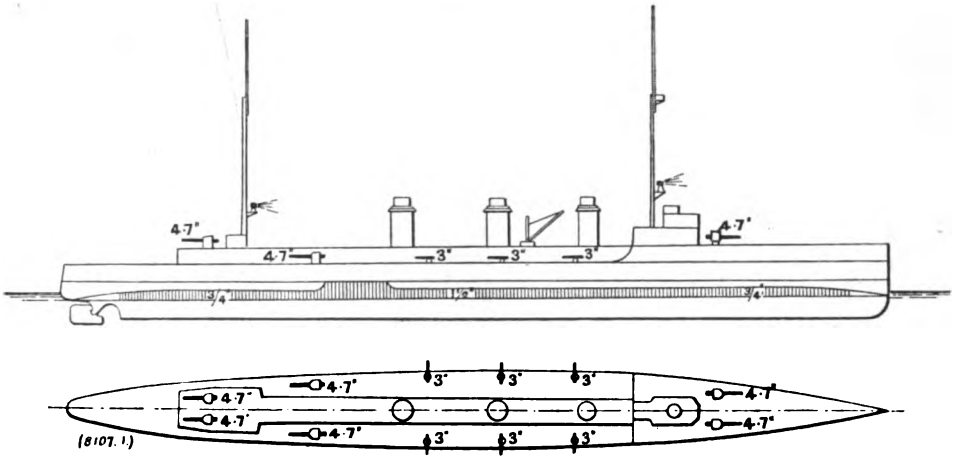
Venezia (*ex-Austrian* **Saida**). **Brindisi** (*ex-Austrian* **Helgoland**).


3·9"
3·9"
3·9"

ITALY.

LIGHT CRUISER.

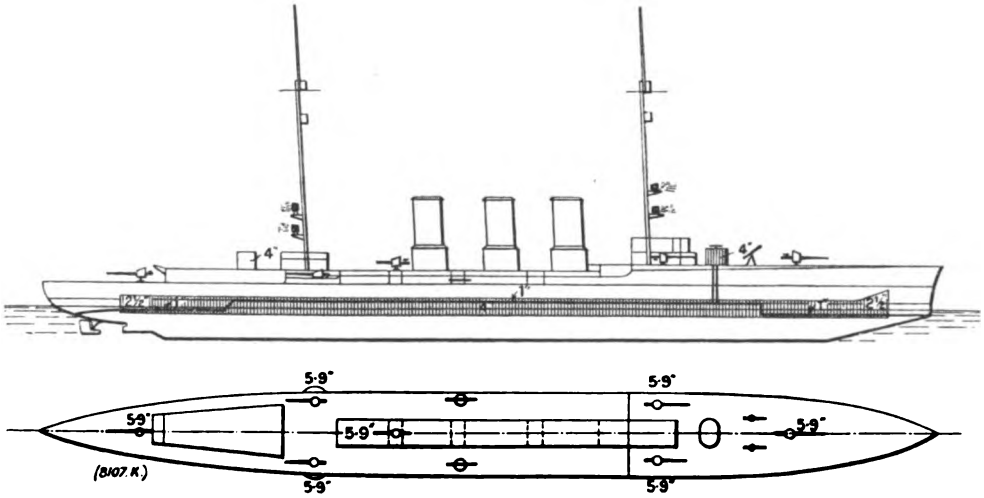
Quarto.



Length (extreme), 431 ft. 9 ins.; Length B.P., 413 ft. 5 ins.; Speed, 28 knots; 8,390 tons; Completed, 1912.
Armament, 6—4·7-in.; 6—14-pr.; 2—2-pr. A.A.; 2 above-water 18-in. torpedo tubes; 126 mines.

LIGHT CRUISER.

Ancona (*formerly German* Graudenz).

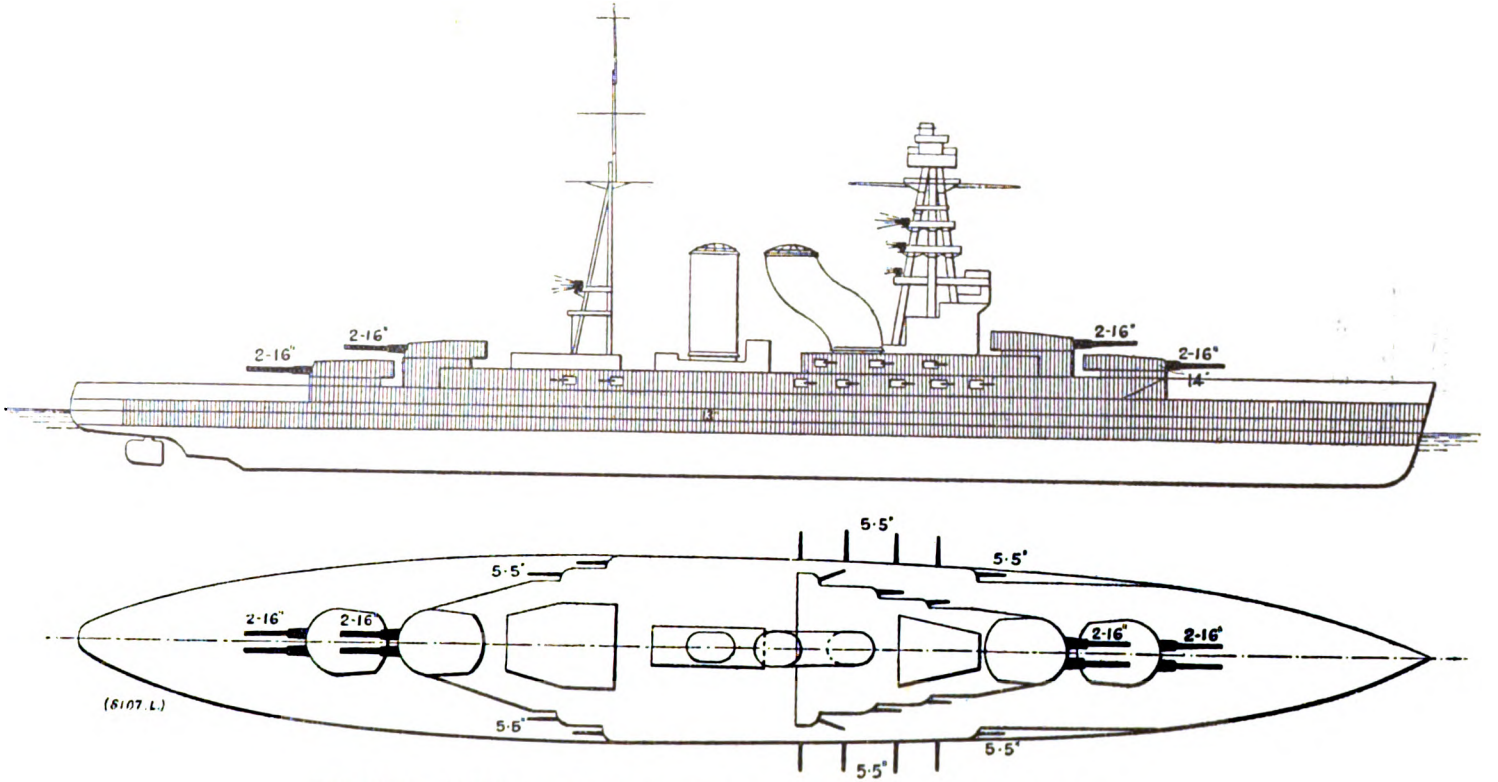


Length (extreme), 456 ft.; Speed, 27½ knots; 3,840 tons; Completed, 1914.
Armament, 7—5·9-in.; 2—3-in. A.A.; 2 submerged and 2 above-water torpedo tubes; 120 mines.

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BATTLESHIPS.

Nagato. **Mutsu.**



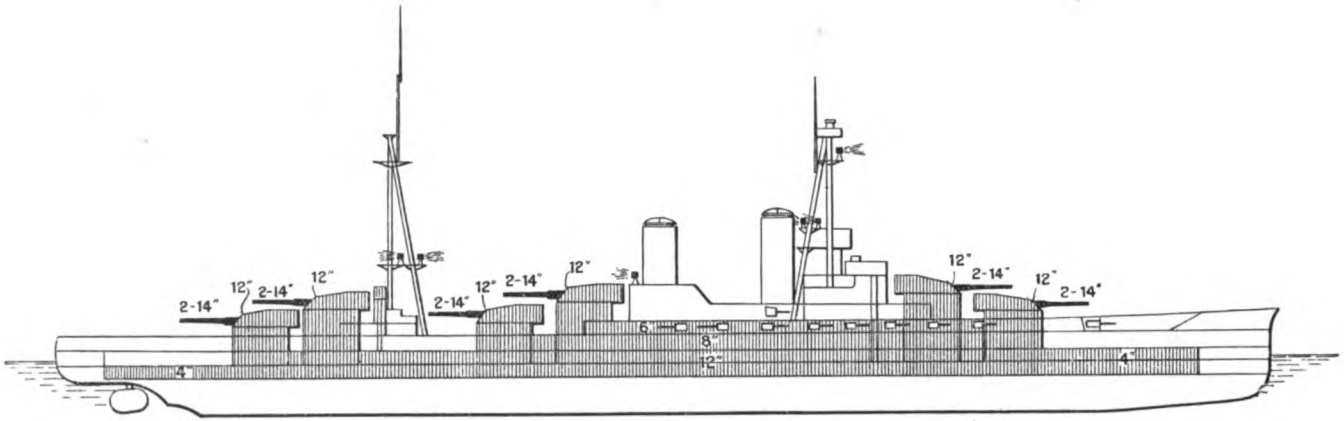
Length (extreme), 700 ft. ; Length B.P., 660 ft. 7 ins. ; Speed, 23 knots ; 33,800 tons ; Completed, 1920-1921.
Armament, 8—16-in. ; 20—5·5-in. ; 4—18-pr. A.A. ; 4 above-water and 4 submerged 21-in. torpedo tubes.

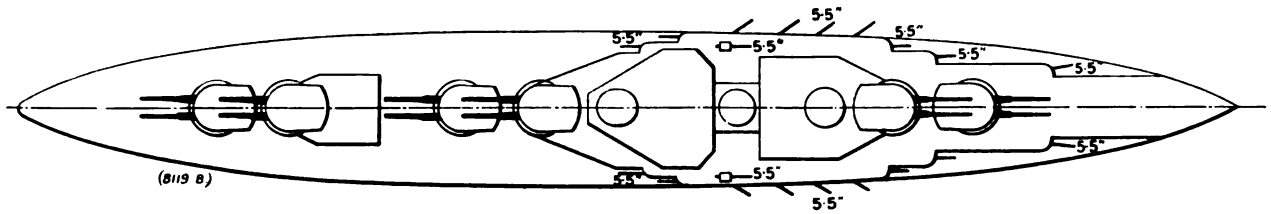
Digitized by Google

JAPAN.

BATTLESHIPS.

Ise. ***Hyuga.**





Length (extreme), 683 ft. ; Length B.P., 640 ft. ; Speed, 23 knots ; 31,260 tons ; Completed, 1917-18.
Armament, 12—14-in. ; 20—5·5-in. ; 4—12-pr. A.A. 6 submerged 21-in. torpedo tubes.

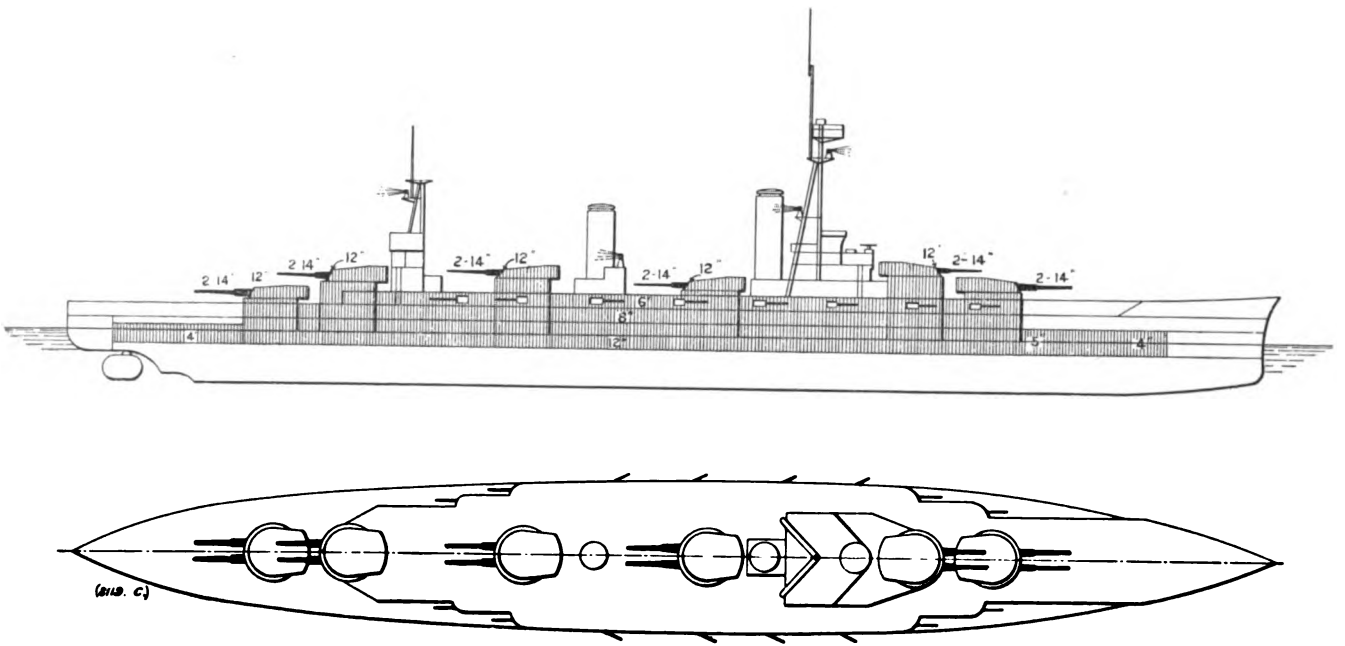
* Foremast has been reconstructed (1927) as for Nagato.

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JAPAN.

BATTLESHIPS.

Fuso. **Yamashiro.**



Length (extreme), 673 ft. ; Length B.P., 630 ft. ; Speed, 22·5 knots ; 30,600 tons ; Completed, 1915-17.
Armament, 12—14-in. ; 16—6-in. ; 4—12-pr. A.A. ; 6 submerged 21-in. torpedo tubes.

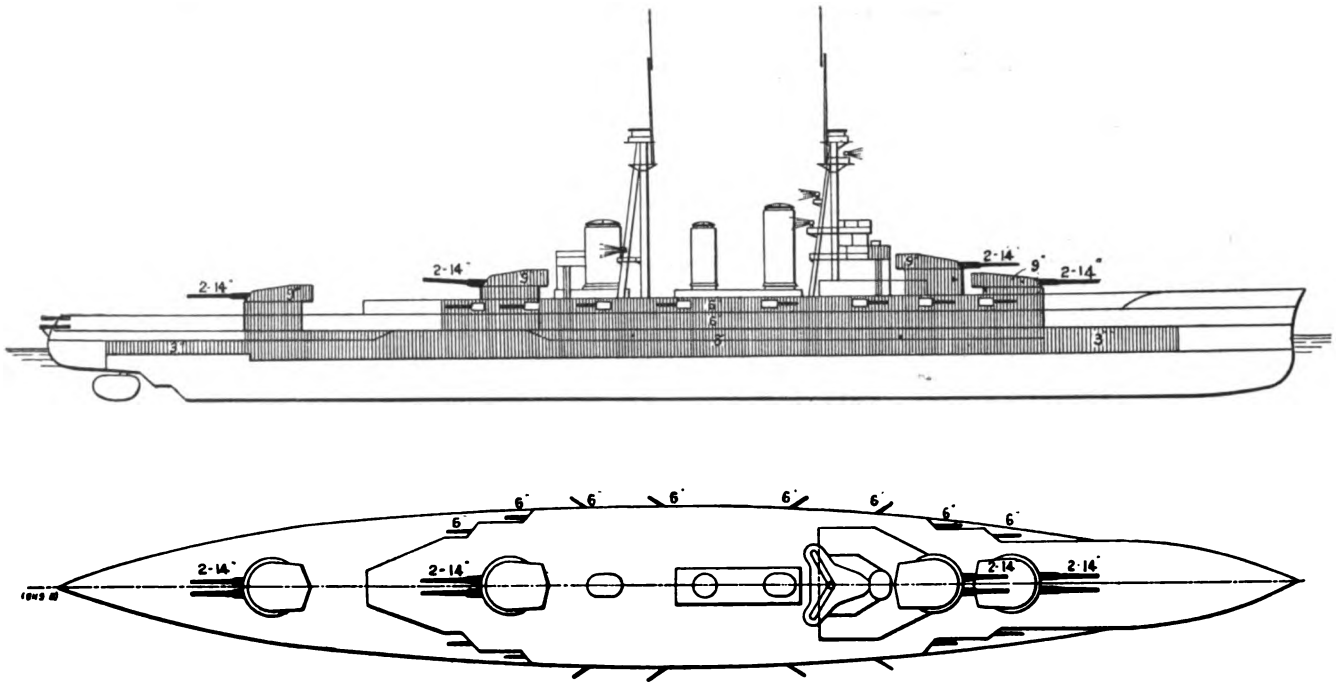
Foremast has been reconstructed.

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JAPAN.

BATTLE-CRUISERS.

Kongo. Hiyei. Haruna. Kirishima.



Length (extreme), 704 ft. ; Length B.P., 653 ft. 6 ins. ; Speed, 27·5 knots ; 27,500 tons ; Completed, 1913–15.
Armament, 8—14-in. ; 16—6-in. ; 4—12-pr. A.A. ; 8 submerged, 21-in. torpedo tubes.

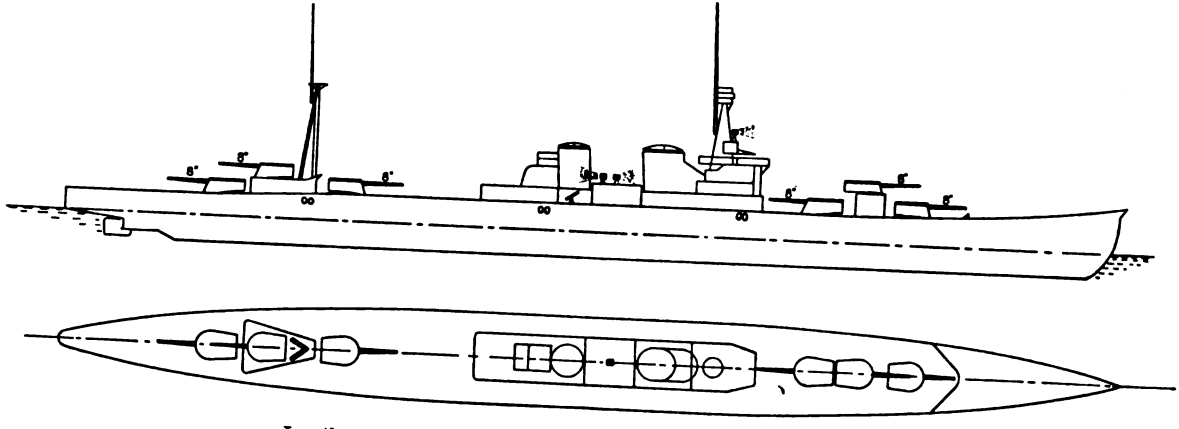
NOTE.—Funnels and foremast of Haruna have been modified as for "Nagato" Class.

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JAPAN.

LIGHT CRUISERS.

Furutaka. Kako Aoba.* Kinugasa.*



Length (extreme), 595 ft. ; Length B.P., 580 ft. ; 7,100 tons ; Speed, 33 knots.
Armament, 6—8-in, ; 4—3-in. A.A. ; 12 above-water torpedo tubes.

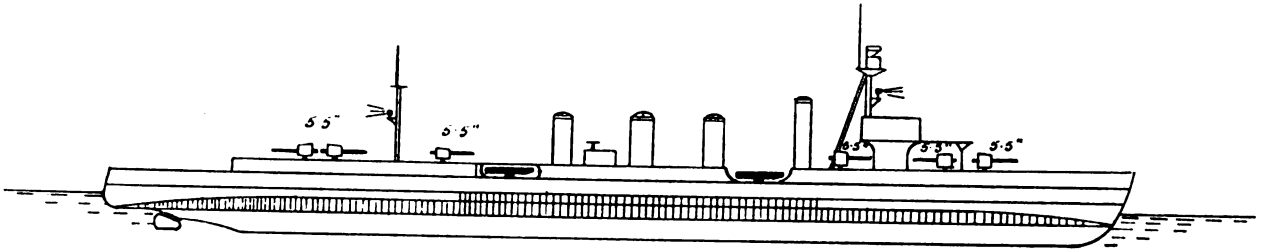
* Aoba and Kinugasa are of the same general design, but the armament is different. They carry 6—8-in. in twin mountings, and 20—4·7-in. A.A.

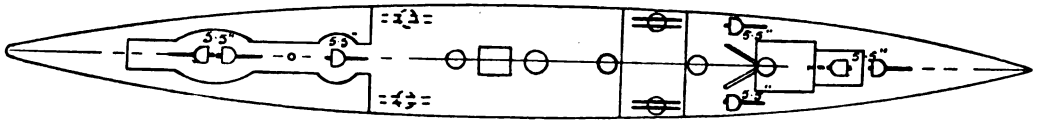
Digitized by Google

JAPAN.

LIGHT CRUISERS.

Naka. Abukuma. Sendai. Jintsu.*





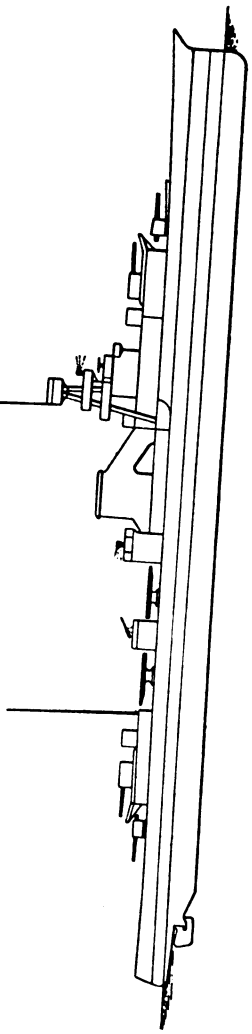
Length (extreme), 535 ft. ; Speed, 33 knots ; 5,595 tons.
Armament, 7—5·5-in. ; 3—3-in. A.A. ; 1 Pom Pom A.A. ; 4 twin torpedo tubes.
* Bow of Jintsu has been modified to give more flair.

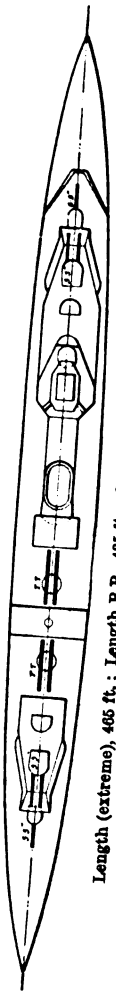
Digitized by Google

JAPAN.

LIGHT CRUISER.

Yubari.





Length (extreme), 465 ft.; Length B P., 435 ft.; 3,100 tons; Speed, 33 knots. Completed, 1923.
Armament, 6—5·5-in.; 2—3 in. A.A.; 2 M.; 2 twin 21-in. torpedo tubes.

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JAPAN

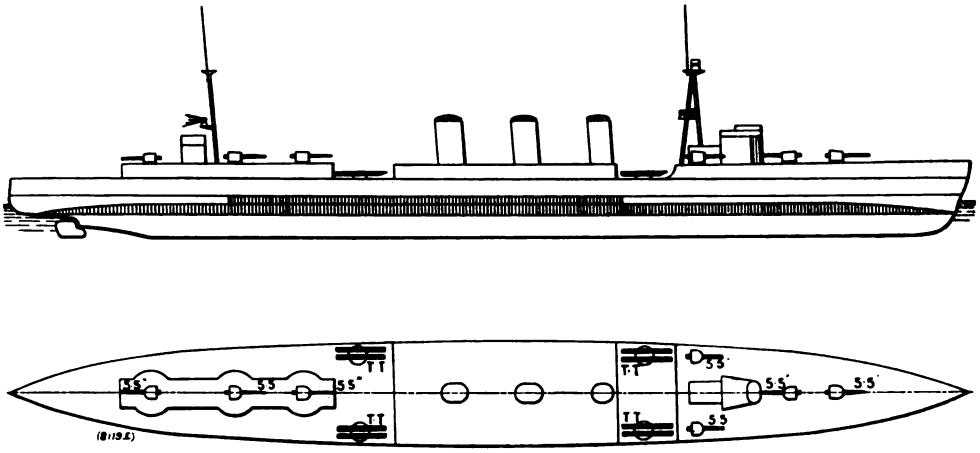
LIGHT CRUISERS.

* { Isudzu
{ Nagara.

* { Natori.
{ Yura.

*Kinu.

O-I. Kiso. Kitakami. Tama. Kuma.

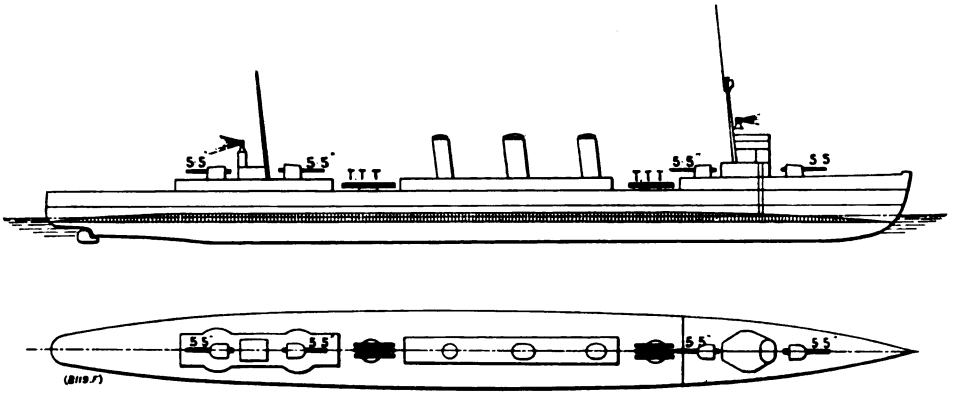


Length (extreme), 585 ft.; Length B.P., 500 ft.; Speed, 33 knots; 5,500 tons; Completed, 1920–21.
Armament, 7—6·5-in.; 2—3-in. A.A.; 4 twin above-water 21-in torpedo tubes.

* Plans apply generally to these vessels except that aircraft hangar is arranged in bridge structure. The displacement about 70 tons higher than O-I, etc. These vessels were completed, 1922–23.

LIGHT CRUISERS.

Tatsuta. Tenryu.



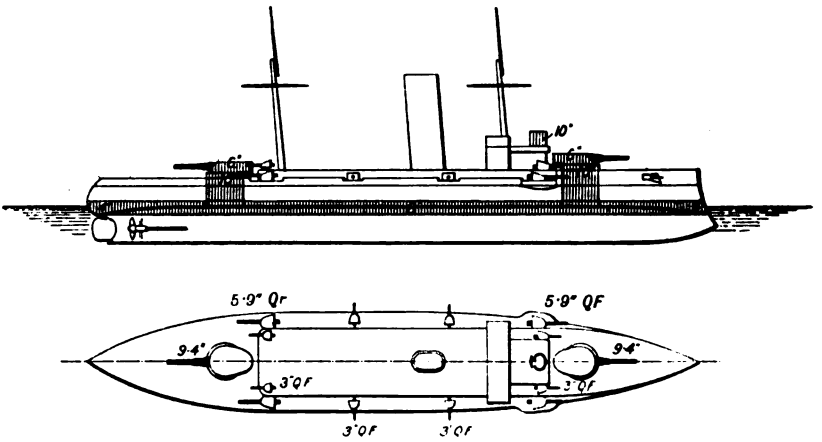
Length (extreme), 468 ft.; Speed, 31 knots; 3,500 tons; Completed, 1919.
Armament, 4—5·5-in.; 1—12-pr. A.A.; 2 triple above-water torpedo tubes.
Fitted for Minelaying.

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NETHERLANDS.

COAST DEFENCE SHIPS.

Hertog Hendrik. **Marten Tromp.**

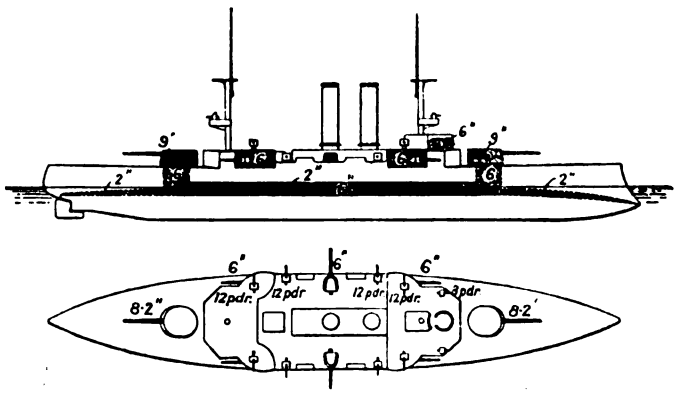


Length, 317–330 ft.; 5000—5216 tons; Speed, 16 knots; Completed, 1903—1906.
Armament: Hertog Hendrik: 2—9·4-in.; 6—5·9-in.; 4—2·9-in.; 4 or 6 small.
Marten Tromp: 2—9·4-in.; 4—5·9-in. 8—2·9-in.; 6 small.

NORWAY.

COAST DEFENCE SHIPS.

Norge. **Eidsvold.**



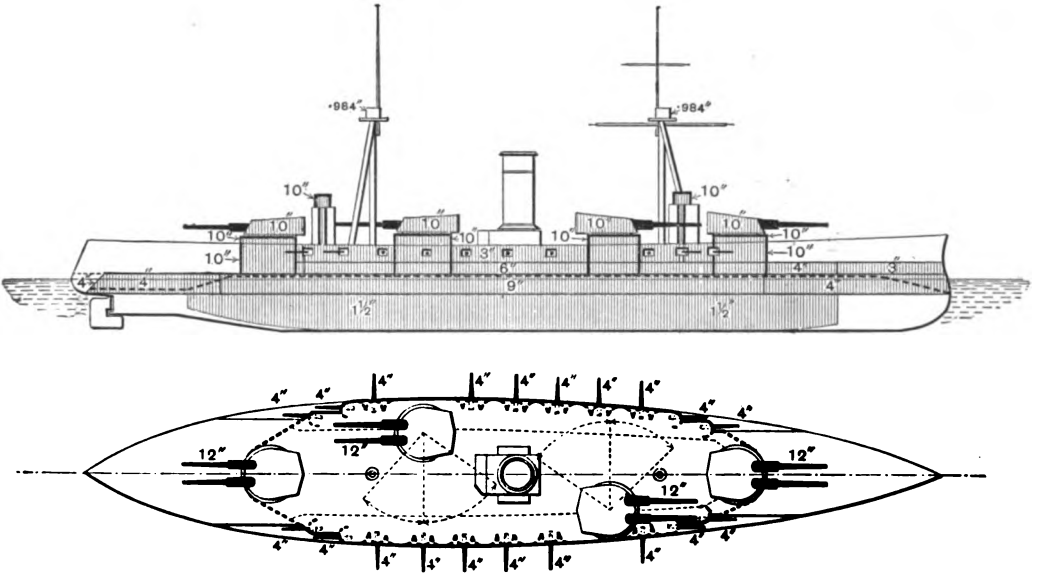
Length, 310 ft.; 4,166 tons; Speed, 16·9 knots; Completed, 1901.
Armament, 2—8·2-in.; 6—6-in.; 8—12-pr.; 6 small.

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SPAIN.

BATTLESHIPS.

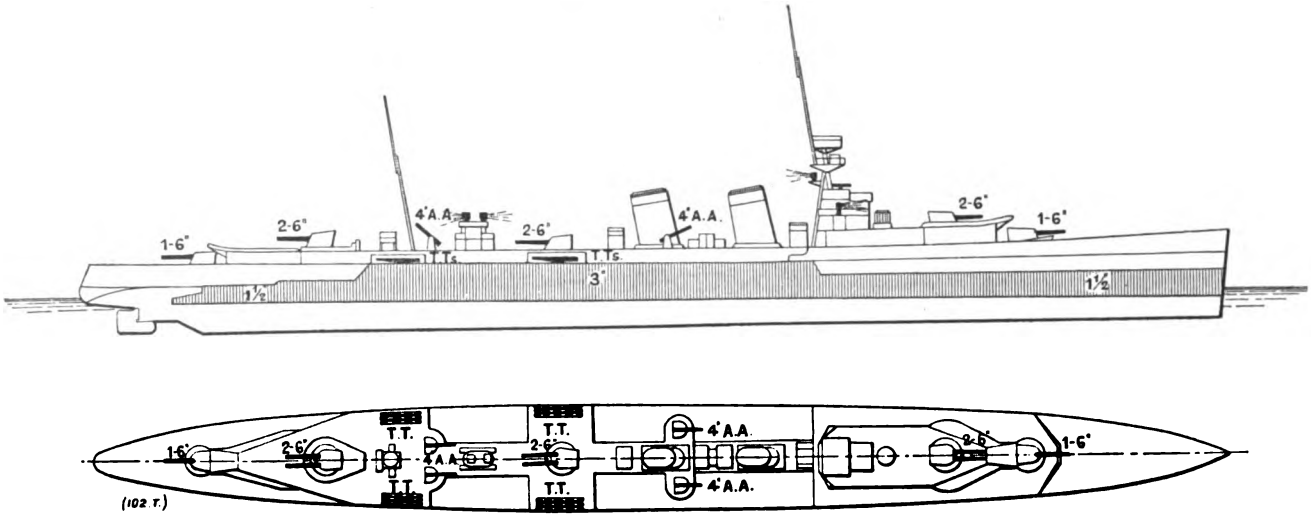
Alfonso XIII. **Jaime I.**


·984"
·984"
10"
10"
10

SPAIN.

LIGHT CRUISERS.

Principe Alfonso. **Almirante Cervera**



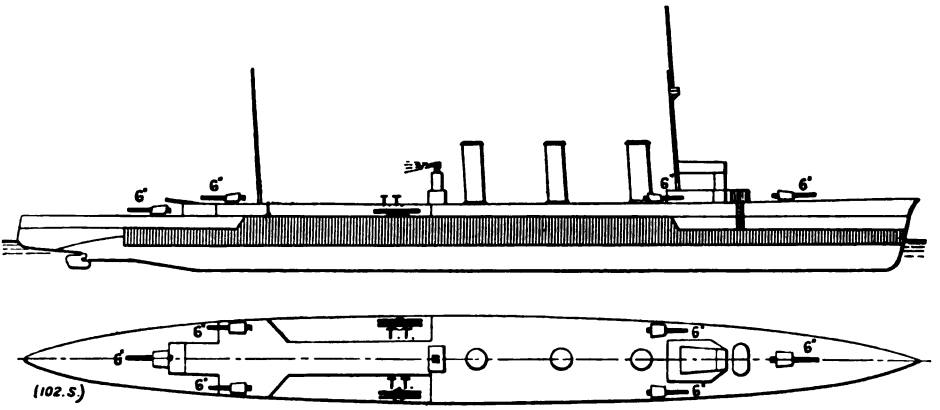
Length (extreme), 579 ft. 6 ins.; Length, B.P., 545 ft.; 7,850 tons; Speed, 23 knots.
Armament, 8—6-in.; 4—4-in. A.A., 2—3 pr., 4 triple above-water torpedo tubes (21-in. torpedoes).

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SPAIN.

LIGHT CRUISERS.

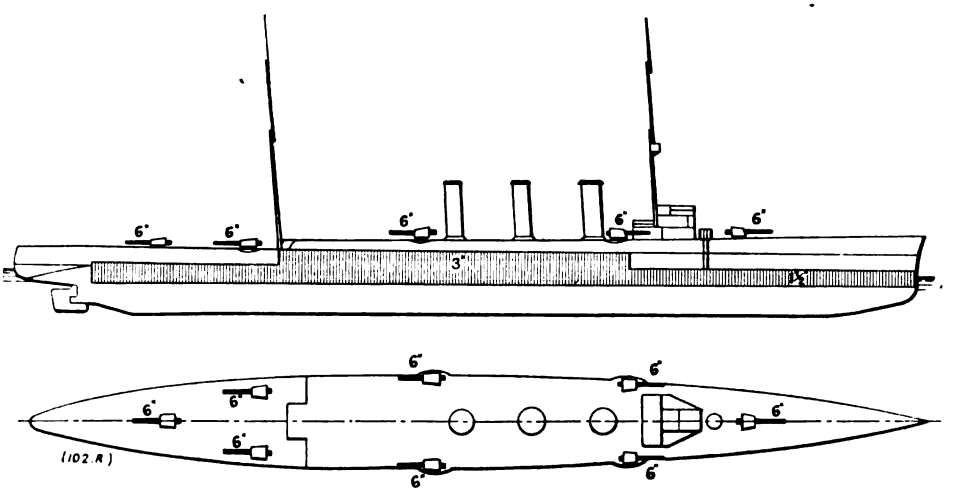
Don Blas Lezo. **Mendez Nuñez.**



Length (extreme), 462 ft. ; Length B.P., 439 ft. ; 4,650 tons ; Speed, 29 knots. Completed, 1924.
Armament, 6—6-in. ; 4—3-pr. A.A. ; 4 M. ; 4 above-water triple torpedo tubes (21-in. torpedoes).

LIGHT CRUISER.

Reina Victoria Eugenia.



Length (extreme), 462 ft. ; 6,130 tons ; Speed, 25½ knots ; Completed, 1922.
Armament, 9 *—6-in. ; 1—12-pr. ; 4—3-pr. A.A. ; 4 M. ; 1 L. ; 4 torpedo tubes.

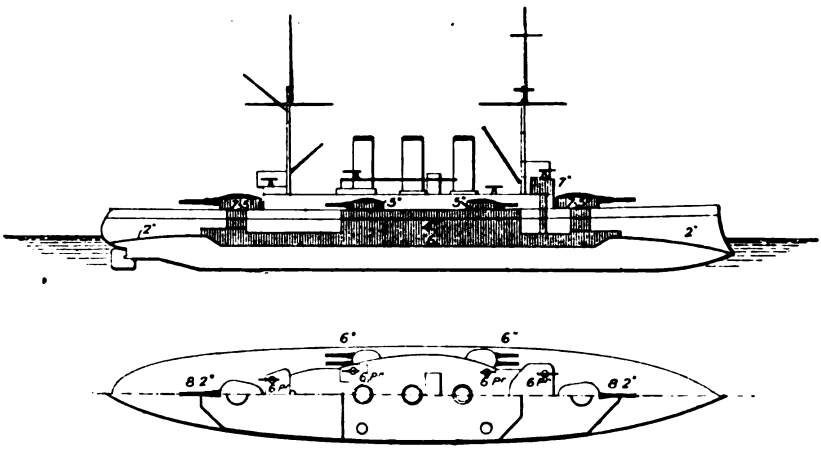
* NOTE.—There should be two 6-in. guns abreast forward instead of one on the centre line as shown.

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SWEDEN.

BATTLESHIP.

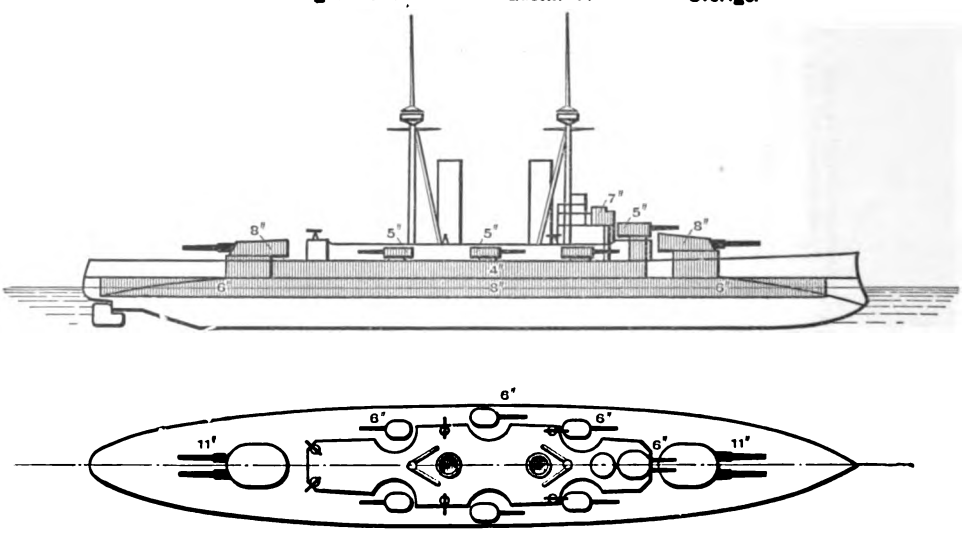
Oscar II.



Length, 313·6 ft. ; 4,584 tons ; Speed, 18 knots ; Completed, 1907
Armament, 2—8·2-in. ; 8—6-in. ; 8—6-pr. ; 1—1-pr.

ARMOURED CRUISERS.

Drottning Victoria. **Gustav V.** **Sverige.**



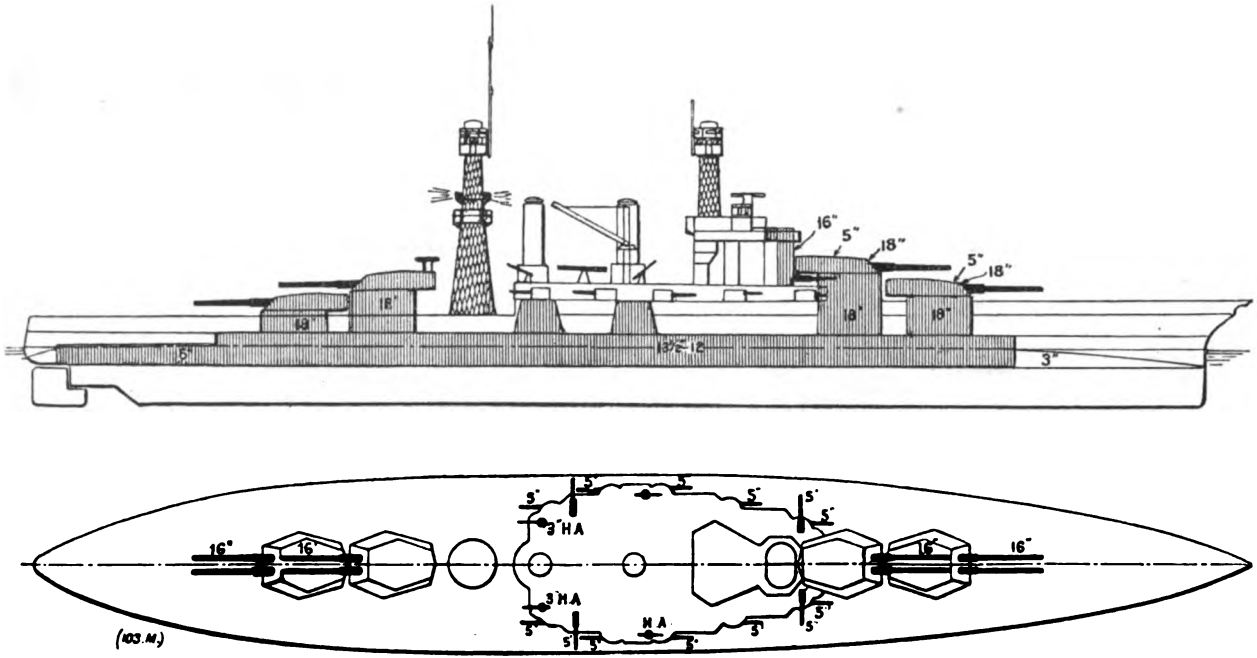
Length, 396·7 ft. ; 7,500 tons ; Speed, 22 knots ; Completed, 1917–1922.
Armament, 4—11-in. ; 8—6-in. ; 6—12-pr. ; 4 small.
Sverige, 6,990 tons.

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UNITED STATES.

BATTLESHIPS.

Colorado. **Maryland.** **West Virginia.**



Length (extreme), 624 ft. ; Length W.L., 600 ft. ; Speed, 21 knots ; 32,600 tons ; Maryland, completed, 1921 ; Colorado and West Virginia, completed, 1923.

Armament, 8—16-in. ; 12—5-in. ; 8—5-in. A.A. ; 4—6-pr. ; 2 submerged 21-in. torpedo tubes.

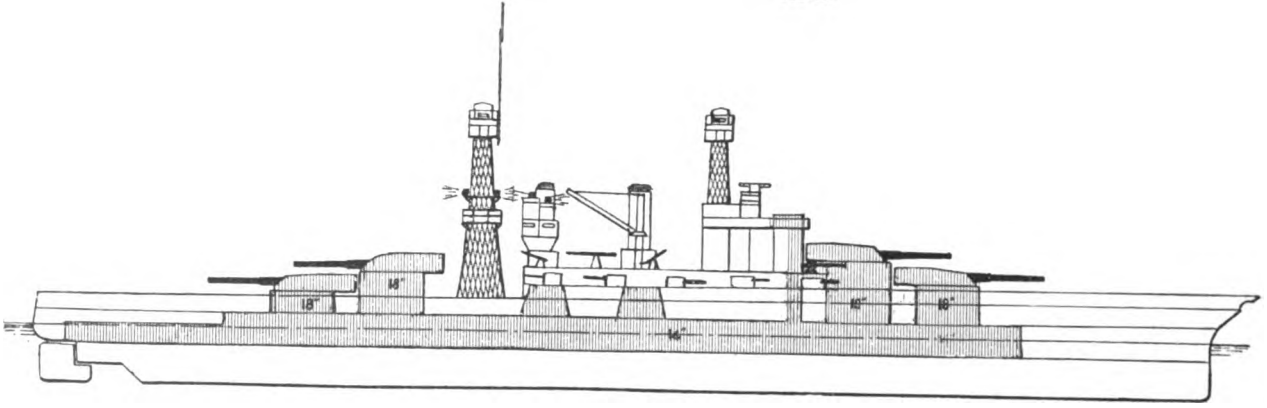
Catapult mounted right aft on Quarter Deck.

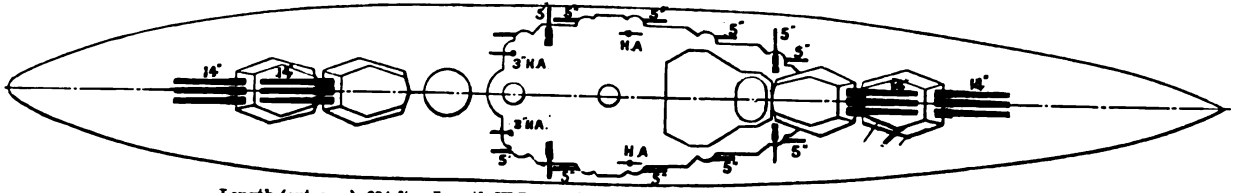
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UNITED STATES

BATTLESHIPS.

California. **Tennessee.**





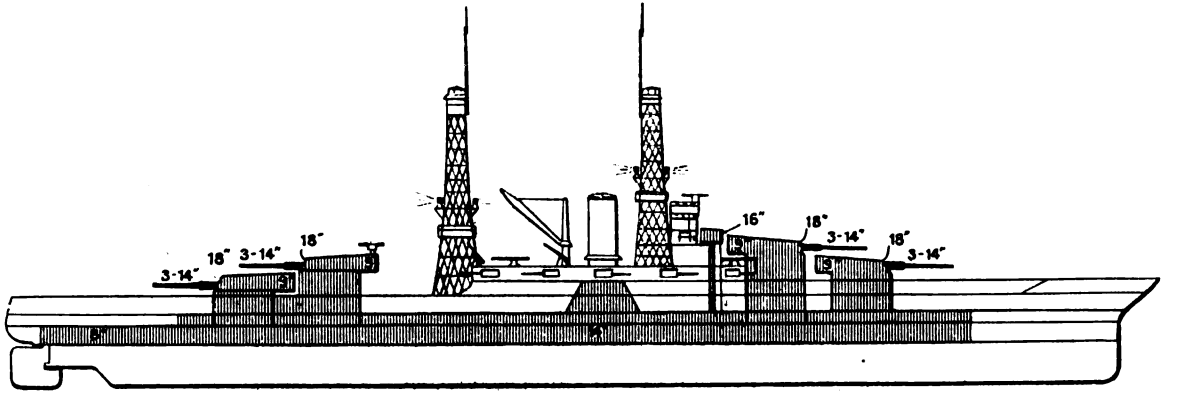
Length (extreme), 624 ft. ; Length W.L., 600 ft. ; Speed, 21 knots ; 32,300 tons ; Completed, 1920-21.
Armament, 12—14-in. ; 12—5-in. ; *8—14-pr. A.A. ; 4—6-pr. : 2 submerged 21-in. torpedo tubes.
Catapult has been fitted right aft on Quarter Deck.
* The 8—14 pr. A.A. armament is being replaced by 8—5-in. A.A.

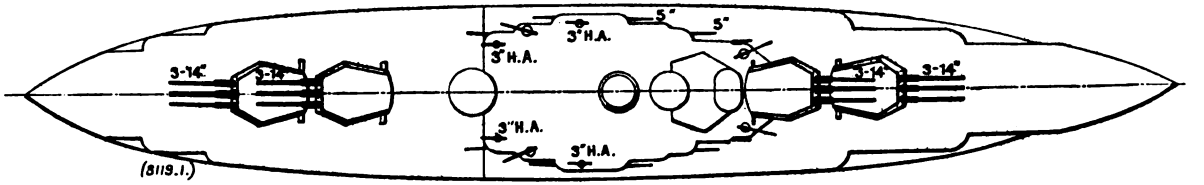
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UNITED STATES.

BATTLESHIPS.

Idaho. **New Mexico.** **Mississippi.**





Length (extreme), 624 ft. Length W.L., 600 ft.; Speed, 21 knots; 32,000 tons; Completed, 1917–19.
Armament, 12—14-in.; 12—5-in.; 8—14-pr. A.A.; *4—6-pr.; 2 submerged 21-in. torpedo tubes.

* Idaho, 4—3-pr.

Catapult mounted right aft on Quarter Deck.

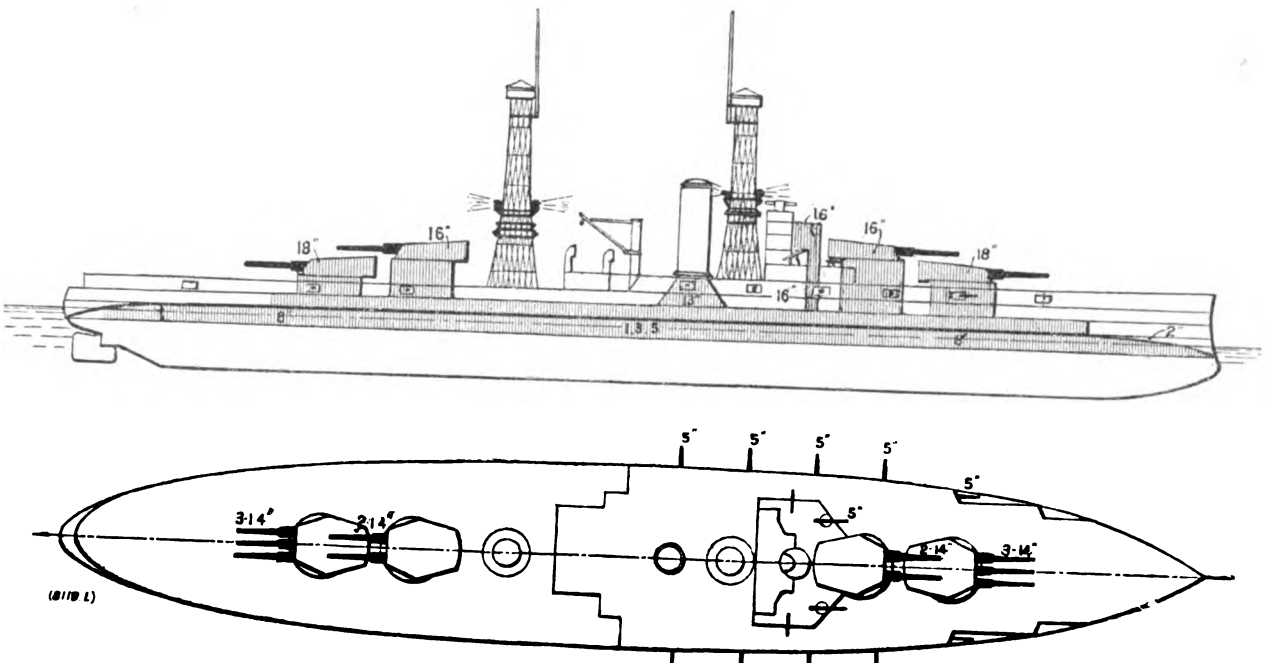
Mississippi has an additional turret catapult.

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UNITED STATES

BATTLESHIPS.

Nevada **Oklahoma.**



Length (extreme), 583 ft. ; Length W.L., 575 ft.; Speed, 20·5 knots ; 27,500 tons ; Completed, 1916.
Armament, 10—14-in. ; 12—5-in. ; 8—3-in. A.A. ; 4 smaller guns. 2 submerged 21-in. torpedo tubes ; 1 catapult ; 3 aeroplanes.
Catapult mounted.

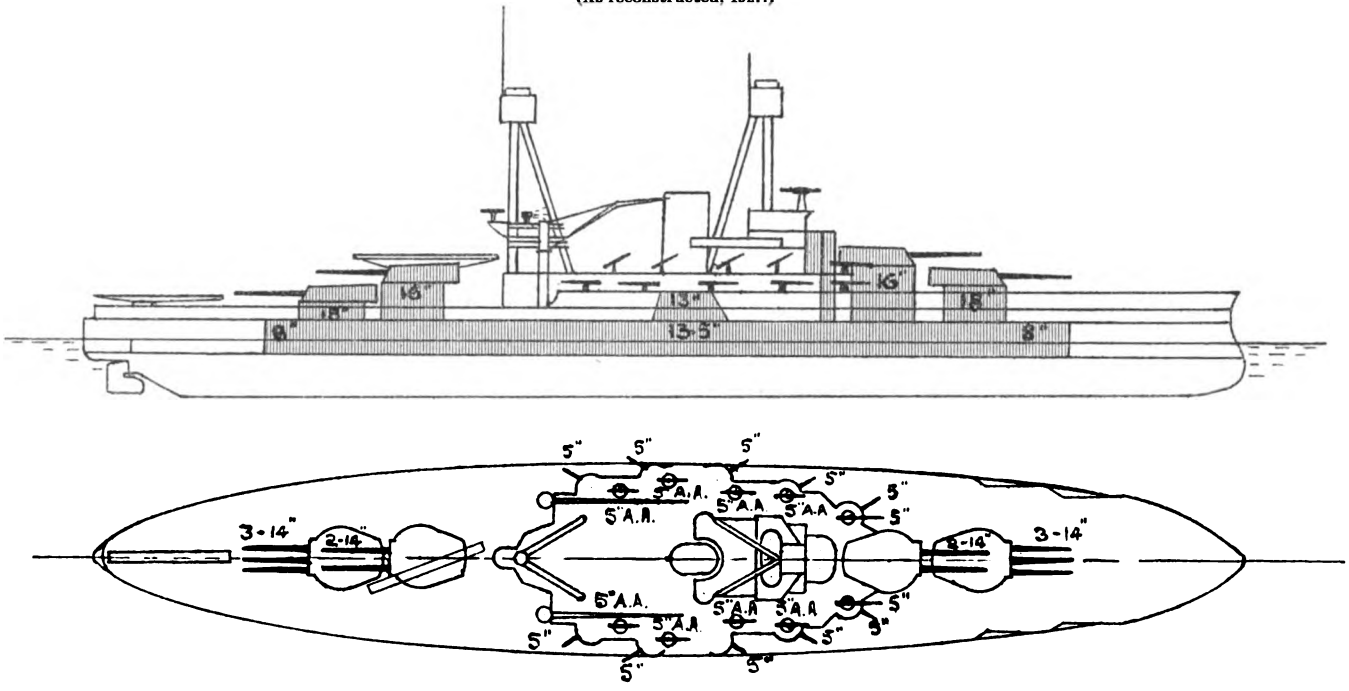
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UNITED STATES.

BATTLESHIPS.

Nevada. **Oklahoma.**

(As reconstructed, 1927.)



Length (extreme), 583 ft.; Length W.L., 575 ft.; Speed, 20·5 knots; 27,500 tons.

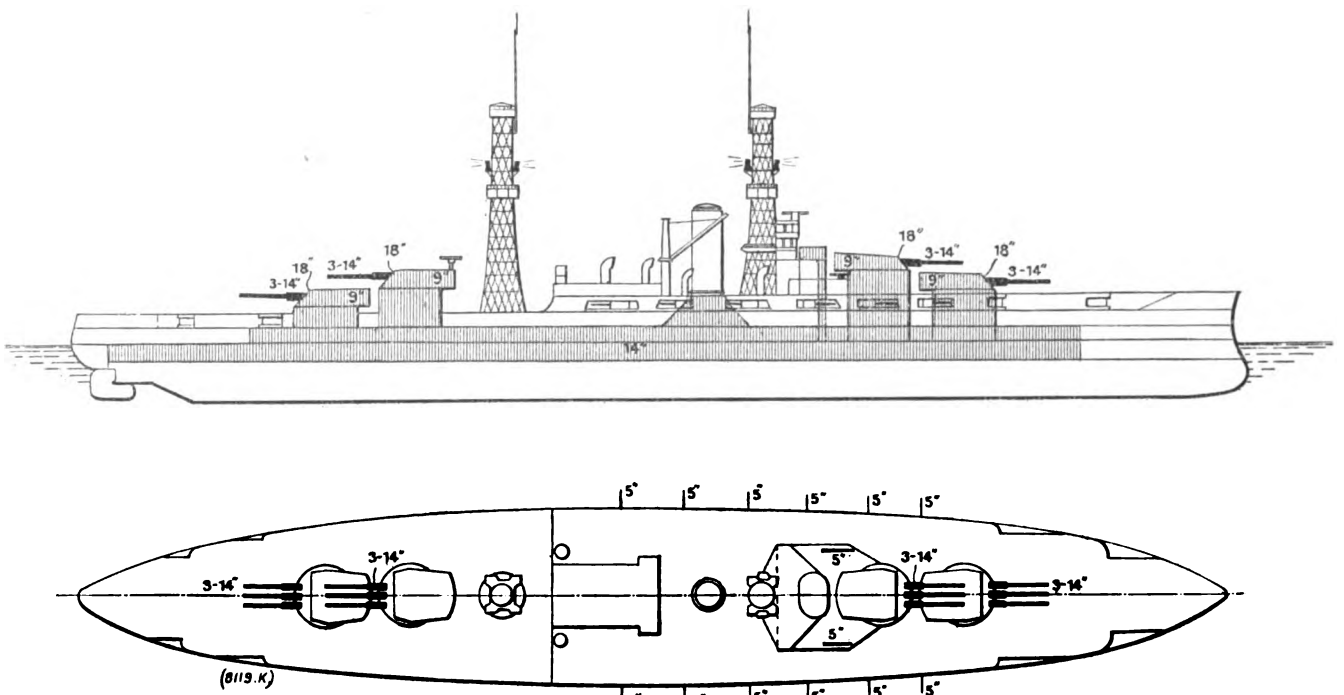
Armament, 10—14-in.; 12—5-in.; 8—5-in. A.A.; 4 smaller guns. 2 submerged 21-in. torpedo tubes; 1 catapult; 3 aeroplanes.

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UNITED STATES.

BATTLESHIPS.

Arizona. **Pennsylvania.**



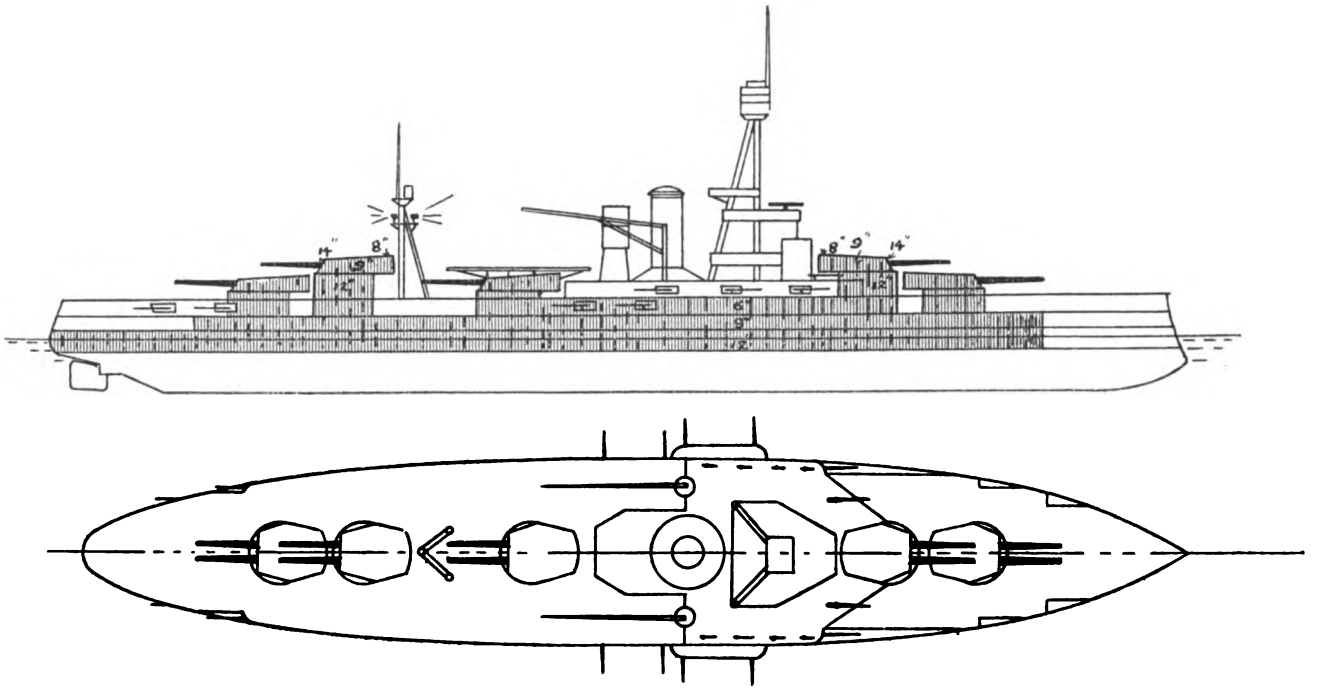
Length (extreme), 608 ft. ; Length B.P., 596 ft. ; Speed, 21 knots ; 31,400 tons ; Completed, 1916.
Armament, 12—14-in. ; 14—5-in. ; 8—3-in. A.A. ; 4—3-pr. ; 2 submerged 21-in. torpedo tubes.
Catapult mounted right aft on Quarter Deck.

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UNITED STATES.

BATTLESHIPS.

New York. **Texas.**



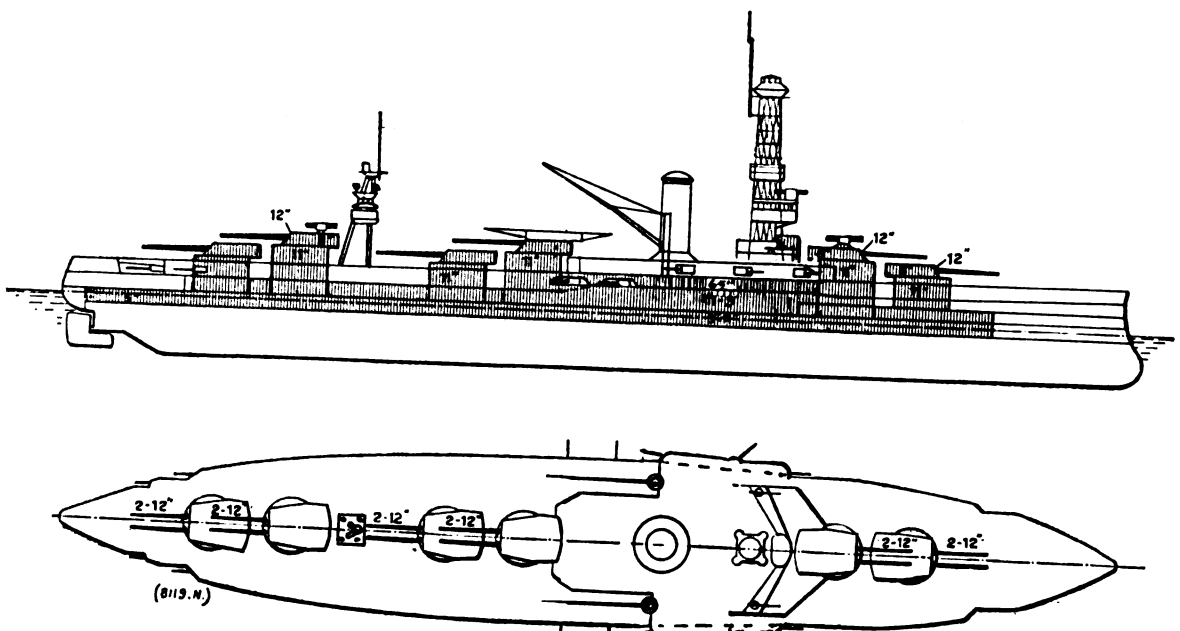
Length (extreme), 573 ft.; Length W.L., 565 ft.; Speed, 21 knots; 29,600 tons; Completed, 1914.
Armament, 10—14-in.; 16—5. in.; 8—3-in. A.A.; 4—3-pr.; 2—1-pr.; 2 M.; 1 catapult.

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UNITED STATES.

BATTLESHIPS.

Arkansas. **Wyoming**



Length (extreme), 562 ft. ; Length W.L., 554 ft. ; Speed, 20·5 knots ; 28,500 tons ; Completed, 1912.
Armament, 12—12-in. ; 16—5-in. ; 8—3-in. A.A. ; 4—6* or 3-pr. ; 2—1-pr. ; 2 M. ; 1 catapult.

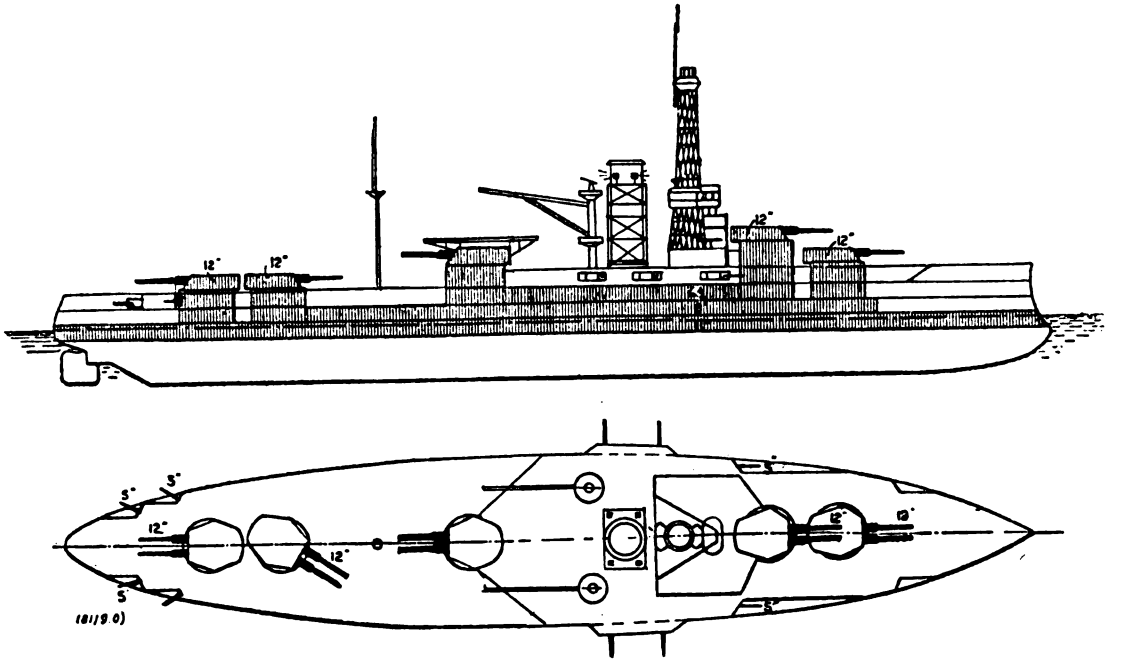
* In Wyoming.

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UNITED STATES.

BATTLESHIPS.

Utah. **Florida.**



Length (extreme), 521 ft. 6 ins.; Length W.L., 510 ft.; Speed, 20·75 knots; 21,825 tons; Completed, 1911.
Armament, 10—12-in.; 12—5-in.; 8—3-in. A.A.; *4—3-pr.; 4 M.; 1 catapult.

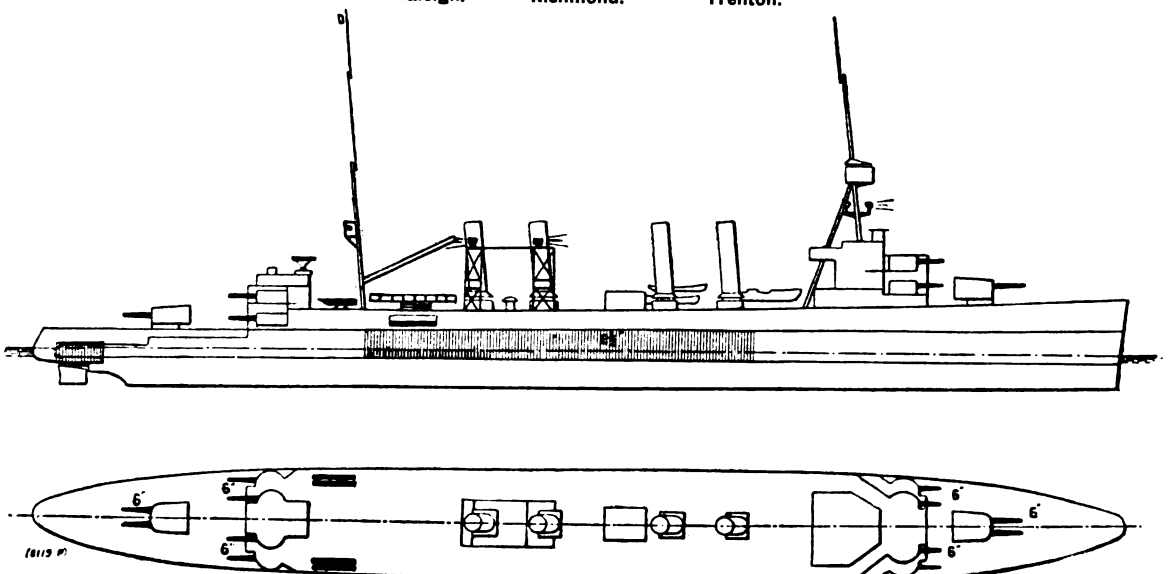
* Florida, 4—6-pr.

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UNITED STATES.

SCOUT CRUISERS.

Cincinnati. **Concord.** **Detroit.** **Raleigh.** **Marblehead.** **Richmond.** **Memphis.** **Trenton.** **Milwaukee.** **Omaha.**



Length (extreme), 555 ft. 6 ins.; Length W.L., 550 ft.; Speed, 33·7 knots; 7,500 tons. Completed in 1923-25.
Armament, 12—6-in.; 4—3-in. A.A.; 2—3-pr.; 2 twin and 2 triple above-water 21-in. torpedo tubes.

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BRITISH AND FOREIGN ORDNANCE TABLES

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VICKERS' GUNS AND MOUNTINGS.

Naval Guns and Mountings.

	37-mm. 1-pdr. auto. 30 cal.	37-mm. 1½-pdr. auto. 42·5 cal.	40-mm. 2-pdr. auto. 40 cal.	47-mm. 3-pdr. semi-auto. 50 cal.	57-mm. 6-pdr. semi-auto. 50 cal.	3-in. semi-auto. 50 cal.	4-in. semi-auto. 40 cal.	4-in. semi-auto. 45 cal.	101·6-mm. 4-in. 50 cal.	120-mm. 4·7-in. 45 cal.	120-mm. 4·7-in. 50 cal.	152-mm. 6-in. 45 cal.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	1·457	1·457	1·575	1·85	2·244	3	4	4	4	4·724	4·724	6
Length of bore . . ins.	43·5	62	62	92·5	112·2	150	160	180	200	212·58	236·2	270
Length of gun . . ins.	73·75	94	95·7	98·9	118·6	157	166·6	187·8	207·3	219·784	243·4	279·728
Weight of gun . .	432 lb.	490 lb.	616 lb.	6 cwts.	c. q. 9 1	c. q. 19 0	c. q. 25 0	c. q. 36 0	c. q. 40 0	t. c. 3 2	t. c. 3 4	t. c. 6 10
Weight of projectile . lbs.	1	1·5	2	3·3	6	12·5	31	31	31	48·5	50	100
Muzzle velocity . . f.s.	1,800	2,100	2,000	2,800	2,600	2,789	2,300	2,700	3,000	2,789	2,900	2,850
Muzzle energy . . f.t.	22·5	46	55·5	180	280	675	1,135	1,565	1,935	2,616	2,916	5,630
Penetration of W.I. plate at muzzle, Gavre formula. Uncapped projectile . ins.	—	—	—	6·7	7·5	9·0	10·8	13·6	16	16·6	17·8	22
Rounds per minute . .	250	200	200	30	28	25	20	18	15	12	12	10
Weight of mounting and shield . . .	—	—	1,040 lb.	c. q. lb. 11 2 5	c. q. lb. 17 3 10	t. c. q. lb. 1 3 1 10	t. c. q. lb. 2 9 3 24	t. c. q. lb. 2 18 3 0	t. c. q. lb. 3 5 0 27	t. c. q. 3 5 2	t. c. q. 4 1 0	t. c. q. l. 12 9 2 3
Angle of elevation . deg.	—	—	80°	20°	20°	20°	30°	30°	30°	35°	35°	30°
Angle of depression . deg.	—	—	5°	10°	10°	10°	10°	10°	10°	10°	10°	5°
Weight of shield . .	—	—	—	c. q. lb. 1 0 20	c. q. lb. 1 2 10	c. q. lb. 2 0 14	c. q. lb. 7 2 0	c. q. lb. 7 2 0	c. q. lb. 14 1 13	c. q. lb. 9 0 0	—	t. c. q. lb. 4 4 3 16
Thickness of shield . .	—	—	—	·22	·25	·25	·144	·144	·25	·144	—	1·5 and 1

	152-mm. 6-in. 50 cal.	152-mm. 6-in. semi-auto. 50 cal.	203-mm. 8-in. 50 cal.	203-mm. 8-in. 55 cal.	254-mm. 10-in. 45 cal.	254-mm. 10-in. 50 cal.	305-mm. 12-in. 45 cal.	305-mm. 12-in. 50 cal.	343-mm. 13·5-in. 45 cal.	356-mm. 14-in. 45 cal.	356-mm. 14-in. 50 cal.	381 mm. 15-in. 45 cal.	406-mm. 16-in. 45 cal.	Howitzers. 120-mm. 4·7-in. How. 18 cal.	280-mm. 11-in. How. 8 cal.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	6	6	8	8	10	10	12	12	13·5	14	14	15	16	4·724	11
Length of bore . . ins.	300	300	400	440	450	500	540	600	607·5	630	700	675	720	85	88
Length of gun . . ins.	309·728	311·17	413·1	453·1	464	514	556·5	616·5	625·9	648·4	718·4	695·7	742·2	89·9	96·6
Weight of gun . .	t. c. 6 18	t. c. 8 5	t. c. 15 0	t. c. 16 10	t. c. 23 10	t. c. 26 1	t. c. 40 0	t. c. 43 10	t. c. 66 0	t. c. 73 0	t. c. 80 0	t. c. 87 0	t. c. 105 0	c. q. 11 1	t. c. 1 18
Weight of projectile . .	100	100	256	256	500	500	850	850	1,400	1,350	1,350	1,660	2,000	45	350
Muzzle velocity . . f.s.	3,000	2,900	3,000	3,150	2,800	2,933	2,800	2,933	2,500	2,756	2,600	2,700	2,650	1,200	585
Muzzle energy . . f.t.	6,240	5,830	15,976	17,615	27,180	29,825	46,210	50,705	60,675	71,100	78,725	83,915	97,390	450	830
Penetration of W.I. plate at muzzle, Gavre formula. Uncapped projectile . ins.	23·7	22·6	34·5	38	39·2	41·7	47·3	50·3	51·5	54·5	58·3	57	59	—	—
Rounds per minute . .	10	10	6	6	3	3	2	2	1·5	1·35	1·35	1·2	1·2	12	—
Weight of mounting and shield . . .	t. c. q. lb. 12 1 0 0	t. c. q. lb. 14 0 1 24	—	—	—	—	—	—	—	—	—	—	—	t. c. q. lb. 3 17 0 11	—
Angle of elevation . deg.	35°	30°	—	—	—	—	—	—	—	—	—	—	—	70°	—
Angle of depression . deg.	10°	7°	—	—	—	—	—	—	—	—	—	—	—	5°	—
Weight of shield . .	t. c. q. lb. 3 4 0 0	t. c. q. lb. 5 5 1 15	—	—	—	—	—	—	—	—	—	—	—	t. c. q. lb. 1 19 1 14	—
Thickness of shield . .	·625 and ·375	3 to 1·2	—	—	—	—	—	—	—	—	—	—	—	1·9 and ·5	—

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	75-mm. 2·953-in. Field. 28 cals.	84-mm. 3·3-in. Field. 28 cals.	90-mm. 3·543-in. Field. 29 cals.	10·5-cm. 4·134-in. Howr. 20 cals.	10·5-cm. 4·134-in. Field. 28 cals.	10·5-cm. 4·134-in. Field. 45 cals.	5-in. Field. 41 cals.	15-cm. 5·9-in. Howr. 21·5 cals.	20·3-cm. 8-in. Howr. 14 cals.	9·2-in. Siege Howr. 17·2 cals.	12-in. Siege Howr. 17·3 cals.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	2·953	3·3	3·543	4·134	4·134	4·134	5	5·906	8	9·2	12
Length of bore . . ins.	82·68	92·735	102·75	82·68	115·75	186·03	205	127	112	159·16	207·6
Length of gun . . ins.	86·48	96·96	108·2	88·48	121·95	192·53	212·25	135·15	122·1	170·5	222·3
	c. q.	c. q.	c. q.	c. q.	c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.
Weight of gun . . .	7 0	9 1	9 3	9 1	17 2	1 13 0	2 11 2	1 19 2	2 18 0	4 5 2	9 2 2
Weight of projectile . lb.	14·33	18·5	22·05	30·9	30·9	35·27	56	90·4	220·5	290	750
Muzzle velocity . . f.s.	1,920	2,000	2,100	1,560	2,000	2,740	2,700	1,790	1,476	1,520	1,520
Muzzle energy . . f.t.	366	513	675	521	856	1,840	2,831	2,010	3,330	4,645	12,015
Rounds per minute . .	25	25	12	10	10	8	6	4	2	2	1
	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.
Weight of mounting complete with shield . .	18 0 0	20 3 0	23 1 0	22 0 6	38 2 0	2 15 2	4 10 0	2 16 2	5 3 0	11 15 0	28 7 2
Weight of shield . . .	1 3 14	1 3 26	2 0 16	1 2 0	3 0 0	3 2	—	—	—	—	—
Thickness of shield . ins.	·125	·125	·128	·144	·144	4 mm.	—	—	—	—	—
Angle of elevation . deg.	40°	40°	40°	45°	40°	43°	50°	42°	60°	50°	65°
Angle of depression . deg.	5°	5°	5°	5°	5°	0°	5°	0°	0°	0°	0°

	Tank Guns.			Mountain Howitzers.		Landing.
	57-mm. 6-pdr. Semi-Auto. 27 cals.	47-mm. 3-pdr. Semi-Auto. 35 cals.	40-mm. 2-pdr. Semi-Auto. 37 cals.	75-mm. 2·953-in. Jointed. 17 cals.	105-mm. 4·134-in. Jointed. 11 cals.	76·2 mm. 3-in. 22 cals.
Construction	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	2·244	1·85	1·575	2·953	4·134	3
Length of bore . ins.	60·6	64·75	58·27	53·15	45·474	66
Length of gun . ins.	64	68·15	60·47	56·75	51·274	70·34
	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.
Weight of gun . . .	2 2 14	2 2 0	1 2 0	3 1 24	5 0 0	3 3 4
Weight of projectile . lb.	6	3·3	2	14·33	26·45	12·5
Muzzle velocity . f.s.	1,200	1,854	2,000	1,450	1,148	1,640
Muzzle energy . f.t.	60	79	55·5	210	242	233
Rounds per minute . .	—	—	—	18	10	25
	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.
Weight of mounting complete with shield . .	2 2 0	2 2 0	—	11 2 5	12 0 0	9 2 0
Weight of shield . . .	—	—	—	1 0 12	1 1 10	1 1 15
Thickness of shield . ins.	—	—	—	·144	·144	·192
Angle of elevation . deg.	30°	30°	—	50°	40°	23°
Angle of depression . deg.	10°	10°	—	10°	0°	10°

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Guns Mounted on Aircraft.

	·303 Auto. Observer's Gun. 79·2 cal.	·303-in. Auto. Pilot's Gun. 93·7 cal.	·5-in. Auto. Pilot's Gun. 60 cal.	1-in. Auto. 30 cal.	37-mm. 1-pdr. Auto. 22 cal.	40 mm. 2-pdr. Semi-Auto. 40 cal.
Construction	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore ins.	·303	·303	·5	1	1·457	1·575
Length of bore ins.	24	28·4	30	30	32·05	63
Length of gun ins.	40	40·5	45	55	59·7	65·25
Weight of gun lb.	22	30	52	110	150	234
Weight of projectile lb.	174 grs.	174 grs.	550 grs.	·441	1	2
Muzzle velocity f.s.	2,300	2,400	2,635	1,542	1,200	2,300
Muzzle energy f.t.	·9	1	3·75	7·25	10	73
Rounds per minute	500 to 600	500 to 1,000	400 to 600	150	150	—
Weight of mounting lb.	—	—	—	60	142	432
Angle of elevation deg.	—	—	—	40°	60°	60°
Angle of depression deg.	—	—	—	90°	60°	30°

Anti-Aircraft Guns.

	·303-in. Auto. 93·7 cal.	·5-inch Auto. 90 cal.	1-in. Auto. 40 cal.	40-mm. 2-pdr. Auto. 40 cal.	40-mm. 2·2-pdr. Auto. 50 cal.	40-mm. 2·2-pdr. Semi-Auto. 50 cal.	47-mm. 3-pdr. Semi-Auto. 50 cal.	3-in. Q.-F. 45 cal.	3-in. Semi-Auto. 50 cal.	3·15-in. Semi-Auto. 43 cal.	4-in. Semi-Auto. 45 cal.	4 in. Semi-Auto. 50 cal.	4·7-in. Semi-Auto. 40 cal.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore ins.	·303	·5	1	1·575	1·575	1·575	1·85	3	3	3·15	4	4	4·724
Length of bore ins.	28·4	45	40	62	78·75	78·75	92·5	135	150	135	180	200	188·96
Length of gun ins.	43	66·7	64·1	95·7	136·0	81	98·9	143·1	157·6	142·6	187·8	208	197
Weight of gun	32 lb.	80 lb.	187 lb.	616 lb.	900 lb.	c. q. lb. 2 0 17	c. q. lb. 6 0 0	c. q. lb. 18 1 0	t. c. q. 1 2 0	c. q. lb. 18 2 0	t. c. q. 1 18 3	t. c. q. 2 0 0	t. c. q. 3 1 0
Weight of projectile lb.	174 grs.	770 grs.	·551	2	2·205	2·205	3·3	12·5	14·33	15·43	31	31	48·5
Muzzle velocity f.s.	2,400	2,725	2,000	2,000	2,625	2,625	2,800	2,600	2,560	2,460	2,700	2,850	2,560
Muzzle energy f.t.	1	5·65	15·5	55·5	105	105	180	586	650	645	1,565	1,740	2,205
Rounds per minute	500-600	300–400	250	200	100	35	30	20	25	25	18	18	12
Weight of mounting	38 lb.	109 lb.	379 lb.	c. q. lb. 10 3 12	c. q. lb. 14 1 15	c. q. 12 3	c. q. lb. 18 2 3	t. c. q. lb. 1 19 3 9	t. c. q. 2 7 3	t. c. q. 1 7 2	t. c. q. lb. 6 4 0 18	t. c. q. lb. 6 12 0 0	t. c. q. lb. 9 0 1 0
Angle of elevation deg.	80°	90°	80°	80°	85°	90°	80°	90°	90°	85°	90°	90°	90°
Angle of depression deg.	20°	10°	10°	5°	5°	0°	5°	5°	5°	0°	5°	5°	5°

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Infantry Guns.

	44–60 mm.			47 mm.		
	44 mm. Barrel.		60 mm. Barrel.	Armour-Piercing Ammunition.		High-Explosive Ammunition.
	30 cal.		20 cal.	20 cal.		
Construction	Steel		Steel		Steel	
Diameter of bore ins.	1·73		2·36		1·85	
Length of bore ins.	52		47·24		37	
Length of gun ins.	55·5		50·74		40·5	
	Barrel.	Breech ring.	Breech mechanism.	Barrel.	Breech ring.	Breech mechanism.
Weight of gun	75 lb.	50 lb..	26 lb.	78 lb.	55 lb.	31 lb.
Weight of projectile lb.	2·75		5·5	3·3		3·3
Muzzle velocity f.s.	1,706		732	1,600		755
Muzzle energy f.t.	55·5		20·4	58·6		13·0
Weight of mounting complete with shield		326 lb.			346 lb.	
Weight of shield		—			45 lb.	
Thickness of shield		—			3·5 mm.	
	44 mm. barrel		60 mm. barrel.	Low position.		High position.
Angle of elevation deg.	10°		20° to 60°	15°		9° to 45°
Angle of depression deg.	5°		0°	6°		0°

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ELSWICK B.L. AND Q.F. NAVAL GUNS.

This Table is supplied by the Manufacturers.

ABBREVIATIONS: N. = Naval. A.A. = Anti-Aircraft. N.L. = Naval Landing.

	Machine Guns.				Naval or Anti-Aircraft.																	
Diameter of Bore .....ins.	0·303*	0·5	1·457	1·575	1·85	1·85	1·85	2·24	2·24	N.L. 3	A.A. or N. 3	A.A. or N. 3	N.L. 3	A.A. or N. 3·5	A.A. or N. 4	N. 4	A.A. or N. 4	A.A. or N. 4·7	N. 4·7	N. 4·7	N. or A.A. 5	N. 5
do. do. .....mm.	7·7	12·7	37	40	47	47	47	57	57	76	76·2	76·2	76·2	88·9	101·6	102	102	120	120	120	127·2	127·2
Length of Bore .....cals.	79	72	54	49.5	40	46	55	40	50	18·8	45	50	23	45	45	50	40	45	50	40	45	50
	lb.	lb.	lb.	lb.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	tons	tons
Weight of Gun	36·75	82	400	400	4·51	5·0	7·5	7·5	10·5	4	13¼	19	5¼	21¼	40	42	24¼	53	66	44	4·05	3·85
do. do. .....kilos.	16·67	37·2	181·4	181·4	230	254	381	381	533	203	673	978	226·7	1100	2032	2134	1264	2692	3353	2235	4114	3912
do. Projectile .....lbs.	0·0248	0·115	1·25	2·0	3·3	3·3	3·3	6	6	12·5	12·5	12·5	12·5	20	31	31	31	45	45	45	60	60
do. do. .....kilos.	0·0112	0·052	0·567	0·907	1·5	1·5	1·5	2·722	2·722	5·67	5·67	5·67	5·67	9·07	14·06	14·06	14·06	20·41	20·41	20·4	27·2	27·2
	oz.	oz.	oz.	oz.	oz.	oz.	lb. oz.	oz.	lb. oz.	oz.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb. oz.	lb.	lb.	lb.	lb.
do. Charge, M.D. Cordite	0·088	0·05	5·6	5·575	8·25	10·0	1 6	10	1 2·5	15	2·625	4·1	1·0	5·0	7·875,	10·5	5·0	9 11	14	9	16	21
do. do. do. kilos.	0·0025	0·014	0·159	0·152	0·234	0·283	0·635	0·283	0·525	0·369	1·19	1·86	0·45	2·268	3·57	4·76	2·27	4·395	6·35	4·08	7·25	9·5
Muzzle Velocity .....f.s.	2440	2580	3000	2400	2132	2300	3000	1968	2400	1585	2600	3000	1640	2650	2625	3000	2300	2600	3000	2500	2700	3000
do. do. .....m.s.	744	786	914	731	650	701	914	600	731	483	792	914	500	807·7	800	914	701	792	914	762	823	914
Muzzle Energy .....f.t.	1·025	5·3	78·2	79·8	104	121	206	161	240	213	586	780	233	974	1486	1934	1137	2109	2808	1950	3032	3744
do. do. .....m.t.	0·311	1·61	24·2	24·7	32·2	37·5	64	49·8	74·3	66	181	242	72	302	459	599	352	653	869·6	604	939	1160
Penetration at Muzzle ...ins. (Tressider Wrought Iron Pl.)	1·3	2·35	5·8	5·0	5·15	5·8	8·6	5·4	7·3	..	10·3	12·5	5·1	12·4	14·5	17·4	11·6	15·6	19·3	14·7	18·4	21·5
do. do. ...mm.	33	59·6	147·3	127	130·8	147·3	218·4	137·2	185·4	..	261	317	129·5	315	370	442·0	294·6	396·2	490·2	373	724	546
Rounds per Minute.....	650	650	100	100	25	30	30	25	30	20	20	20	15	20	20	12	20	12	12	12	10	10

	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.	N.
Diameter of Bore .....ins.	5·5	6	6	7·5	7·5	8	8	8	9·2	9·2	10	10	12†	12†	13·5	14†	15	15	16	18		
do. do. .....mm.	139·7	152	152	190	190	203	203	203	234	234	254	254	305	305	343	355·6	381	381	406	457		
Length of Bore .....cals.	50	45	50	45	50	45	50	50	45	50	45	50	45	50	45	45	40	45	45	40		
	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons		
Weight of Gun	5·65	8·4	8·75	13·8	15·75	18·0	13·15	17	26·75	28·82	36·25	38·25	59·3	66·7	76	85	85	98·6	83	152		
do. do. .....kilos.	5740	8535	8890	14021	16003	18289	13360	17300	27179	29289	36832	38864	60252	67770	77216	86364	86364	96118	84332	154440		
do. Projectile .....lbs.	83	100	106	200	200	250	253·5	250	380	380	500	500	850	850	1250	1400	1920	1925	2130	3320		
do. do. .....kilos.	37·6	45·36	45·36	90·72	90·72	113·4	115	113·4	172·37	172·37	226·8	226·8	385·55	385·55	567	635	871	873·2	966	1506		
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.		
do. Charge, M.D. Cordite	25·0	31	33·0	74	76	75	81	83	122	136	167	200	260	285	296	324	380	400	580	690		
do. do. do. kilos.	11·34	14·061	15·0	33·566	34·473	34	36·7	37·6	55·34	61·7	75·75	90·72	117·93	129·3	134·26	147	172·3	181	263	313		
Muzzle Velocity .....f.s.	2900	2800	3000	2900	3000	2845	2900	3000	2750	3000	2800	3000	2800	3000	2700	2700	2362	2500	2630	2400		
do. do. .....m.s.	884	853	914	884	914	867	884	914	838	914	853	914	853	914	823	823	720	762	801·6	731		
Muzzle Energy .....f.t.	4840	5436	6240	11663	12481	14031	14780	15600	19926	23714	27181	31203	46208	53046	63187	70770	74275	83425	102160	132600		
do. do. .....m.t.	1499	1683·4	1932	3611·9	3865·2	4345·2	5414	4831·2	6171	7340	8418	9663	14310	16428	19568	21916	23002	25835	31670	41065		
Penetration at Muzzle ...ins. (Tressider Wrought Iron Pl.)	25·8	22·9	25·5	30·6	32·3	32·2	33·5	34·9	35·2	40·1	39·7	44·1	47·3	52·5	51·3	53·2	49·1	53·7	58	60		
do. do. ...mm.	701·0	581·6	647·7	777·2	820·4	817·9	851	886·4	894·1	1018·5	1008·4	1120·1	1201·4	1333·5	1302·0	1351·3	1247	1364	1473	1524		
Rounds per Minute.....	10	9	9	6	6	5	5	5	4	4	3	3	2	2	2	2	2	2	2	2		

* This machine gun can be adapted to fire any pattern of Rifle Calibre Ammunition.

† These guns can be used on Railway Truck Mountings.

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ELSWICK LAND AND AIR SERVICE GUNS AND HOWITZERS.

	Machine Guns.																				
Calibre ... ... ins.	0·303 *	0·5	1·457	1·575	1·457	1·575	1·85	2·244	2·244	2·244	2·75	2·75	2·78	2·953	2·953	2·953	2·953	3	3	3	3·3	3·3	3·3
do. ... ... mm.	7·7	12·7	37	40	37	40	47	57	57	57	70	70	70·6	75	75	75	75	76·2	76·2	76·2	83·8	83·8	83·8
Length of Bore calibres	79	72	54	49·5	..	25	..	23	20·4	50	..	..	..	15·2	33	17	28·4	31	28	23	35	28	33
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	cwts.	lbs.	cwts.	lbs.	lbs.	lbs.	lbs.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.
Weight of Gun	36·75	82	400	400	33	102	83	5	350	8	400	92	280	260	9	2¼	5	9·25	7·25	6	14¼	5	8¼
do. do. ... kilos.	16·67	37·2	181·4	181·4	15	46	37·65	254	159	406	182	41·7	127	118	457	130	254	469	368	305	750	254	432
Type of Breech Mechanism	Auto	Auto	Auto	Auto	Block	Semi-Auto	Block	Semi-Auto	Revolver Type	Block	Screw	Block	Screw	Screw	Block	Block	Block	Screw	Block	Block	Block	Block	Block
System of Obturation ...	Cart.	Cart.	Cart.	Cart.	C. Case	C. Case	C. Case	C. Case	Bare Charges	C.Case	De Bange	C. Case	De Bange	C. Case	C.Case	C.Case	C.Case	C. Case	C. Case	C. Case	C.Case	C.Case	C.Case
Muzzle Velocity ft.-secs.	2440	2580	3000	2400	1400	1474	1200	1580	1000	2800	1200	850	317	1310	1950	1550	1750	2000	1750	1700	1900	1700	1800
do. metre-secs.	744	786	914	731	427	449	366	481	304	853	365	259	96·5	399	594	472	533	609	533	518	579	518	548
Weight of Projectile lbs.	0·0248	0·115	1·25	2·0	1·5	2	3·3	6	6	6	12·5	10	100	12·5	14·3	12·5	14·3	12·5	14·3	12·5	20¼	18¼	18¼
do. do. ... kilos.	0·0112	0·052	0·567	0·907	0·68	0·91	1·5	2·72	2·72	2·72	5·67	4·53	45·36	5·67	6·5	5·67	6·5	5·67	6·48	5·67	9·25	8·39	8·39
Rounds per Minute ...	650	650	100	100	20	30	20	25	25	25	25	15	..	25	20	20	20	20	20	20	20	20	20
Type of Mounting ...	Tripod	Tripod	Pedestal	Pedestal	Infantry Gun	Tank	Infantry Gun	Tank	Aeroplane Guns Non-recoil	Armoured Car or train	Mountain Gun Jointed on Field Carriage	Infantry Gun Field & French Howitzer	Trench Stick Bomb Thrower	Mountain Gun Diff-recoil	Field	Mountain	Light Cavalry.	Anti-aircraft on Motor Lorry	Field	Horse and Field	Anti-aircraft	Naval Landing	Field	Field	Field
					6 loads							9 loads													
Weight of Carriage or Mounting ... kilos.	56 lbs.	86 lbs.	cwts.	cwts.	33 lbs.	cwt.	10	cwt.	lbs.	cwts.	cwt.	max.	cwts.	cwt.	cwts.	cwts.	cwts.	tons	cwt.	cwts.	tons	cwt.	cwt.	cwt.	cwt.
	25·4	39	317·5	317·5	each	3½	loads	7	24	14·55	8	100lbs.	9·5	7	19·5	11·95	19	1·2	15	13½	1·85	9·75	20·5	20·1	19·5
Maximum Elevation ...	75°	75°	80°	80°	15	178	75°	355	11	740	406	45	843	358	990	607	965	1220	765	673	1867	500	1041	1020	990
,, Depression ...	35°	35°	5°	5°	15°	20°	0°	15°	40°	80°	15°	65°	45°–70°	40°	40°	35°	40°	80°	16°	16°	90°	15°	40°	40°	40°
					0°	15°	0°	15°	40°	10°	15°	0°	0°	10°	5°	5°	5°	0°	5°	5°	10°		5°	5°	5°

Calibre ... ... ins.	4	4·134	4·134	4·5	4·7	4·724	5	6	6	6	6·102	8	9·2	9·2	9·2	9·45	11	12	12	14	18
do. ... ... mm.	101·6	105	105	114·3	120	120	127	152	152	152	155	203	234	234	234	240	279·4	305	305	355·6	457·2
Length of Bore calibres	45	45	22	20	12·0	45	8·4	45	12·2	50	21	15	13·2	21	35	..	5·3	17·3	25	45	34·7
	tons	tons	tons	cwts.	cwts.	2½	tons	tons	ton	tons	tons	tons	tons	tons	tons	cwts.	cwts.	tons	tons	tons	tons
Weight of Gun	2·0	1·85	0·5	10	8	2566	2	7·45	1	8·7	1·67	2·9	3·4	6 125	24·2	11·25	13·2	11·25	14¾	83·25	85·7
do. do. ... kilos.	2030	1880	506	508	397	2032	7525	1016	8840	1695	2946	3454	6220	22774	553	670	11430	14987	84585	87075
Type of Breech Mechanism	Screw	Screw	Block	Screw	Block	Screw	Screw	Screw	Block	Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw
System of Obturation ...	C. Case	DeBange	C.Cass	De Bange	C. Case	DeBange	De Bange	De Bange	C. Case	De Bange	DeBange	De Bange	De Bange	DeBange	De Bange	C. Case	De Bange	De Bange	DeBange	De Bange	De Bange
Muzzle Velocity ft.-secs.	2600	2650	1700	1450	1156	2650	2150	2800	1000	3000	1700	1200	1190	1700	2300	444	400	1450	1800	2500	1900
do. metre-secs.	792	808	518	442	350	808	655	854	305	914	518	396	362	518	701	135	122	442	548	762	579
Weight of Projectile lbs.	31	35·27	31	35	35	48·5	60	100	100	100	94·8	200	290	290	380	170	200	750	750	1586	2500
do. do. ... kilos.	14·06	16	14·06	15·87	15·87	22	27·21	45·4	45·36	45·36	43	90·72	131·54	131·5	172·36	77·11	96·72	340·2	340·2	719·4	1134
Rounds per Minute ...	15	15	15	12	15	12	10	8	9	7	9	6	4	4	4	..	3	2	3	2	2
Type of Mounting ...	Anti-Aircraft	Anti-Aircraft	Field Howitzer	Field Howitzer	Field Howitzer	Field	Position Gun Field Carriage	Field Carriage	Howitzer	Railway Truck	Howitzer	Howitzer Railway Truck	Howitzer Field Carriage	Howitzer	Railway Truck	Trench Bomb Thrower	Trench Mortar	Howitzer Railway Truck	Howitzers	Railway Truck	Howitzer Railway Truck
Weight of Carriage or Mounting ... kilos.	tons	tons	cwts.	cwts.	cwts.	tons	tons	tons	..	tons	tons	tons	tons	tons	tons	tons	tons	tons		tons	tons
	4·55	3¼	20·9	19·2	17·3	2·3	3·25	5·5	..	10	2¼	24·6	5·35	5¼	65·5	3·9	2·8	49·5		163·75	163·75
Maximum Elevation ...	4648	3302	1066	984	882	2337	3300	5605	..	10160	2540	25000	5435	5600	66550	3960	2845	50300		166380	166380
,, Depression ...	90°	90°	45°	50°	50°	40°	20°	20°	..	40°	45°	45°	45°	45°	40°	20°–45°	45°–80°	65°		40°	40°
	10°	10°	5°	5°	5°	5°.	5°	5°	..	0°	6°	0°	0°	5°	0°	0°	0°	2°		0°	0°

* This machine gun can be adapted to fire any pattern of Rifle Calibre Ammunition.

BEARDMORE GUNS AND HOWITZERS.

(This Table is supplied by the Manufacturers.)

	Naval.													
Calibre .. .. ins.	4	4	4·724	5·5	5·5	6	6	7·5	8	8	9·2	12	13·5	15	16
,, ...mm.	101·6	101·6	120	140	140	152·4	152·4	190	203·2	203·2	234	305	343	381	406
Length of bore .. .. calibres	50	55	45	50	55	50	55	45	50	55	50	50	46	45	45
Weight of Gun .. .. ..tons	2·15	2·45	3·2	5·5	5·9	7·9	8·35	13·9	17·5	19·25	29	66	77	96	107
,, ,, ... kilos.	2,184	2,489	3,251	5,588	5,994	8,026	8,484	14,122	17,780	18,542	24,402	67,056	78,232	97,536	108,712
Weight of Projectile .. .. lbs.	31	31	45	82	82	100	100	200	250	250	425	950	1,350	1,850	2,100
,, ,, .. kilos.	14·06	14·06	20·4	37·2	37·2	45·36	45·36	90·72	114·2	114·2	192·8	430·9	612·4	839·2	952·5
Muzzle Velocity .. .. f.s.	2,920	3,000	2,754	2,900	3,000	2,950	3,025	2,750	2,900	3,000	2,825	2,825	2,650	2,620	2,675
,, ,, ... m.s.	890	914	838	884	914	899	921	838	884	914	861	861	808	799	815
Muzzle Energy .. .. .. f.t.	1,833	1,935	2,360	4,782	5,117	6,034	6,345	10,488	14,579	15,602	23,518	52,571	63,738	88,056	104,198
,, ,, ... m.t.	568	599	731	1,481	1,584	1,869	1,965	3,248	4,515	4,832	7,283	16,280	20,441	27,270	32,270

	Anti-Aircraft.																Tank Guns.	
	Mobile.			Fixed.														
Calibre .. .. ins.	2·95	3·0	3·3	3·0			4·0		4·0								1·85	2·24
,, ...mm.	75	76·2	84·0	76·2			101·6		101·6								47	57
Length of Bore .. .. calibres	43	40	42·5	55			45		55								30·0	23
Weight of Gun	0·65 ton	0·6375 ton	1·1 tons	1·125 tons			1·925 tons		2·45 tons								1·8 cwts.	5·6 cwts.
,, ,, ... kilos.	660	648	1,118	1,143			1,956		2,489								90·7	284
Weight of Projectile .. .. lbs.	15	16	21	12·5	16		31		25								3·25	6
,, ,, kilos.	6·8	7·26	9·53	5·67	7·26		14·06		11·34								1·49	2·72
Muzzle Velocity .. .. f.s.	2,100	2,100	2,300	3,000	2,620		2,550		3,200								1,750	1,525
,, ,, ...m.s.	640	640	701	914	799		777		975								533	465
Muzzle Energy .. .. .. f.t.	459	489	770	780	762		1,398		1,775								69	96·7
,, ,, ... m.t.	142	151·5	238	241	236		443		550								21·6	30

	Anti-Tank.			Field Guns and Howitzers.														
	Infantry Guns.			Gun.	Gun.	How.	Gun.		How. (Light).		How. (Heavy).		Gun.	How.	How.	Mountain (H.)		
Calibre .. .. ins.	1·85	1·575	2·24	3·0	3·3	4·5	4·134		4·134		4·134		6	8	9·2	3·3		
,, ...mm.	47	40	57	77	84	112	105		105		105		152·4	203·2	234	84		
Length of Bore .. .. calibres	30	37	24	35	31	20	40		20		26		35	17	17	12·25		
Weight of Gun	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.		cwts.		cwts.		tons	tons	tons	cwts.		
,, ,, ... kilos.	1 03	0·92	0·92	8·5	8·6	9·0	21·75		8·0		11·5		3·7	3·0	4·25	4·0		
Weight of Projectile .. .. lbs.	52·4	46·7	46·7	432	437	458	1105		406		584		3,759	3,048	4,318	203		
,, ,, kilos.	3·25	2·0	6·0	16·5	18·5	35	35·2	30·87	35·2	30·87	35·2	30·87	100	200	290	18·5	21·0	
Muzzle Velocity .. .. f.s.	1·49	0·91	2·72	7·5	8·39	15·88	16	14	16	14	16	14	45·36	90·72	131·5	8·39	9·53	
,, ,, ... m.s.	1,620	2,025	700	1,836	1,750	1,100	2,200	2,350	1,350	1,450	1,600	1,725	2,375	1,500	1,500	1,040	960	
Muzzle Energy .. .. .. f.t.	494	617·2	213·4	558	533	335·3	670	716·3	412	442	488	525·2	724	457	457	317	290	
,, ,, ... m.t.	59·1	56·8	20·4	383	393	293·6	1,180	1,182	444	450	625	636·8	3,911	3,120	4,524	138	134	
	18·3	17·6	6·3	118	122	90·9	365	366	137·5	139·4	193·6	197·2	1,211	956	1,401	42·7	41·5	

In same carriage. In same carriage. In same carriage.

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BRITISH NAVAL ORDNANCE.

GUN. Calibre. Inches.	MARK.	Length in Calibres.	Weight of Gun. tons.	Weight of Projectile. lbs.	Weight of Charge. lbs.	Muzzle Velocity. ft./sec.	Muzzle Energy. tons/ft.	CARRIED BY
16	..	..	..	..	..	..	..	Nelson and Rodney
15	I.	42	100	1920	428	2462	82,370	Royal Sovereign, Queen Elizabeth, Hood, and Repulse Classes
13·5	V.	45	76·1	1400	297	2582	57,770	King George, Iron Duke, and Tiger Classes
7·5	Semi-Automatic	50	15	200	61	2841	11,259	Hawkins Class
6	XI.	50	8·5	100	32	2937	5,980	Royal Sovereign, Queen Elizabeth, Tiger
6	VII. VIII.	45	7·4	100	29	2536	4,600	Iron Duke Class
5·5	I.	50	6·3	82	22½	2790	4,425	Hood
4·7	I.	45	3·1	50	11½	2650	2,430	Later flotilla leaders and Destroyers.

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FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1893-96.	Model 1893-96.	Model 1893-96.	Model 1902.	Model 1902-06.	Model 1906.	Model 1906-10.	Model 1910.	Model 1912.	Model 1919.	Model 1920.	Model 1923.	Model 1924.	Model 1924.
Calibre . . . cms.	19·4	16·4	16·4	19·4	24	30·5	30·5	14	34	13·0	15·5	13·8	13·0	20·3
Calibre . . inches	7·6	6·5	6·5	7·6	9·4	12·01	12·01	5·5	13·4	5·1	6·1	5·5	5·1	8
Length . . . cals.	45	45	45	50	50	45	45	55	45	40	50	40	40	50
Total weight . . tons	12·6	7·95	7·95	15	29·2	47	55	5·2	66	4·31	8·7	4·03	3·8	20 39
Firing Charge, A.P. Projectile . . . lbs.	74·5	45·6	43·7	84	148	284	282	22·7	331	17·05	43·25	20	17·05	117
A.P. Projectile . lbs.	199	121	121	199	487	960	924	80·5	1190	70·6	124·8	88·4	70·6	271·8
Muzzle Velocity . f.-s.	2789	2953	2838	3117	2625	2560	2560	2723	2625	2410	2855	2295	2410	2940

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UNITED STATES NAVAL ORDNANCE.

GUN.	MARK.	Length in Calibres.	Total Length.	Capacity of Chamber in Cubic Inches.	Travel of Projectile in Inches.	Weight of Gun.	Weight of Projectile.	Weight of Charge.	Muzzle Velocity.	Muzzle Energy.	Penetration at Muzzle, Krupp Armour, using Capped Projectile.	At 3000 Yards.		At 6000 Yards.		At 9000 Yards.	
												Remaining Velocity.	Penetration.	Remaining Velocity.	Penetration.	Remaining Velocity.	Penetration.
			inch.			tons.	lb.	lb.	ft.-seconds.	ft.-tons.	inch.	ft.-seconds.	inch.	ft.-seconds.	inch.	ft.-seconds.	inch.
3-in. S.A.	V., VI.†	50	159	219	128·3	1·0	13	3·85	2700	658	3·3	1230	1·2	848	0·8	..	..
4-in. R.F.G.	III., IV., V., VI.	40	164	331	134·5	1·5	33	4·85	2000	915	3·4	1156	1·7	897	1·2	..	..
4-in. R.F.G.	VII.	50	205	652	168·3	2·6	33	9·0	2500	1,430	4·6	1432	2·2	979	1·4	853	1·2
4-in. R.F.G.	VIII.‡	50	205	652	168·3	2·9	33	12·3	2800	1,794	5·3	1627	2·6	1033	1·5	878	1·2
5-in. R.F.G.	II., III., IV.	40	206	656	167·8	3·1	50	10·0	2300	1,845	5·3	1286	2·6	934	1·7	829	1·4
5-in. B.L.R.	V., VI.	50	256	1,200	215·6	4·6	60	19·2	2700	3,032	6·2	1692	3·5	1102	2·0	928	1·6
5-in. B.L.R.	VI.	50	256	1,200	215·6	4·6	50[1]	20·5	3000	3,122	6·4	1732	3·2	1057	1·7	877	1·4
5-in. R.F.G.	VII.§	51	261	1,135	215·6	5·0	50	23·8	3150	3,439	6·8	1835	3·4	1091	1·8	895	1·4
6-in. R.F.G.	II., III.	30	196	1,318	145·4	4·8	105	18·8	1950	2,768	5·3	1305	3·2	1009	2·3	909	2·0
6-in. R.F.G.	IV., VII.	40	256	1,320	205·8	6·0	105	18·8	2150	3,365	6·0	1440	3·6	1058	2·4	934	2·1
6-in. R.F.G.	IX.	45	270	1,320	221·7	7·0	105	18·8	2250	3,685	6·3	1511	3·8	1086	2·5	948	2·1
6-in. B.L.R.	VI.	50	300	2,101	247·5	8·3	105	30·0	2600	4,920	8·0	1770	4·7	1207	2·9	996	2·2
6-in. B.L.R.	VIII.	50	300	2,101	247·5	8·6	105	37·0	2800	5,707	8·3	1923	5·2	1297	3·2	1026	2·3
7-in. B.L.R.	II.	45	323	3,643	259·8	12·7	165	58·0	2700	8,338	9·6	1948	6·4	1382	4·2	1083	3 0
8-in. B.L.R.	III., IV.	35	305	3,170	245·8	13·1	260	43·8	2100	7,948	8·6	1576	6·0	1206	4·2	1040	3·6
8-in. B.L.R.	V.	40	343	5,243	273·1	18·1	260	78·0	2500	11,264	10·6	1898	7·5	1428	5·3	1141	4·0
8-in. B.L.R.	VI.	45	369	5,243	299·1	18·7	260	98·5	2750	13,360	12·0	2106	8·6	1589	6·1	1227	4·4
10-in. B.L.R.	I., II.	30	329	6,779	251·1	25·1	510	90·0	2000	14,141	10·7	1590	8·0	1274	6·1	1103	5·0
10-in. B.L.R.	III.	40	413	10,222	327·0	34·6	510	207·5	2700	25,772	15·6	2184	11·9	1747	9·0	1406	6·9
12-in. B.L.R.	I., II.	35	441	11,991	345·2	45·3	870	160·0	2100	26,596	14·2	1733	11·2	1433	8·8	1219	7·2
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	237·5	2400	34,738	16·8	1994	13·3	1649	10·5	1376	8·3
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	305·0	2600	40,768	18·5	2171	14·8	1801	11·7	1500	9·3
12-in. B.L.R.	V.	45	553	16,974	452·0	52·9	870	305·0	•2700	43,964	19·4	2259	15·5	1877	12·3	1561	9·8
12-in. B.L.R.	VI.	45	553	14,970	452·0	53·6	870	340·0	2850	48,984	20·8	2393	16·6	1991	13·3	1653	10·6
12-in. B.L.R.	VII.	50	607	14,296	506·3	56·1	870	340·0	2950	52,483	21·7	2483	17·5	2071	13·9	1719	11·0
13-in. B.L.R.	I., II.	35	479	15,068	374·9	61·4	1130	180·0	2000	31,333	15·0	1679	12·0	1414	9·7	1221	8·1
14-in. B.L.R.	I.[1]	45	642	..	..	63·6	1400	365·0	2600	65,606	39·7*	..	23·4*	..	..	..	18·0
14-in. B.L.R.	II.[2]	50	700	..	..	82·2	1400	..	2800	76,180	44·1	..	27·4	..	..	..	..
16-in. B.L.R.	..	45	..	..	..	105·0	2100		2800	98,500	45·95	..	..	..	..	..	..
16-in. B.L.R.	..	50	..	..	..	130·0	2100		2800	114,270	51·08	..	..	..	..	..	..

[1] Pennsylvania class. [2] New Mexico class.

* De Marre formula.

† A short anti-aircraft 3-in. gun is mounted in many of the ships. ‡ There is now a 4-in. 50-cal. anti-aircraft gun.

§ All battleships from the Delaware class onward have this gun for torpedo defence.

ITALIAN NAVAL ORDNANCE.

Date and Pattern of Gun.	381/40 A. V. 1914 (1)	305/46 A. V. 1909 (2)	305/40 A. 1900–4 (3)	254/45 A. 1907 (4)	254/45 V. 1906 (5)	203/45 A. 1897 (6)	190/45 A. V. 1906–8 (7)	152/45 1911 (8)	120/50 A. V. 1909 (9)	120/45 A. 1913–18 (10)	102/45 A. 1917 (11)	Carried by
Desig. by Calibre, in cms.	38·1	30·5	30·5	25·4	25·4	20·3	19	15·2	12	12	10·2	(1) Monitors
Calibre, in inches	15	12	12	10	10	8	7·5	6	4·75	4·75	4	(2) Duilio Class Cavour Class Dante Alighieri
Total length, in feet	51·67	47·77	41·707	39·07	38·715	31·126	29·22	23·42	20·38	18·38	15·715	
Length of Bore, in inches	511·7	477·9	383·42	358·4	370·5	308·9	281·7	219·2	204·64	174·64	150·74	(4) S. Giorgio Class
Length, in cals.	40	46	40	45	45	45	45	45	50	45	45	(5) Pisa
Total weight, in tons	83·56	63	51·77	34·5	35·34	19·6	14·48	7·03	3·66	4·1	2·33	(7) San Giorgio Class Pisa
Weight of Firing Charge, Armour-piercing Projectile lb.	..	346	194	185	185	51·8	71	..	..	..	..	(8) Duilio Class Campania Libia
Weight — Armour-piercing Projectile lb.	1934	997	913	494	494	269	200	..	..	..	..	
Weight — Common Shell lb.	1929	884	882	490	490	256	198·5	101	48·7	48·7	30·3	(9) Cavour Class Dante Alighieri Libia Quarto
Muzzle Velocity, in f.-s., A.P. Projectile	2297	2756	2347	2789	2789	2559	2789	2723	2788	2460	2788	
Muzzle Energy in foot-tons	71,000	52,700	36,300	26,800	26,800	12,280	10,870	5400	2650	2060	1642	
Perforation at Muzzle,† wrought iron, ins.	47·4	50	38·3	39·3	39·3	28·5	28·8	..	..	..	..	
Perforation Krupp Steel, 3000 yds.	..	9·8 9000 metres	..	..	..	..	..	..	..	..	..	

† By Tressider's Formula. A. = Armstrong. V. = Vickers.

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JAPANESE NAVAL ORDNANCE

Date and Pattern of Gun.	KM. (1)	V. (2)	A. (3)	V. (4)	A. (5)	A. (6)	V. (7)	— (8)	A. (9)	Carried by
Desig. by Calibre, in cms.	40·6	35·6	20·3	15·2	15·2	15·2	15·2	14	12	(1) Mutsu Class.
Calibre, in inches	16	14	8	6	6	6	6	5·5	4·7	(2) Ise Class. Fuso Class. Kongo Class.
Total length, in feet	..	..	..	..	..	..	..	..	..	
Length of Bore, in ins.	..	..	..	..	..	..	..	..	..	(4) Kongo.
Length of Bore, in cals.	45	45	45	50	50	45	45	50	50	(5) Fuso Class. Kongo Class (except Kongo). Yahagi. Tone.
Total weight, in tons.	..	83	17·3	8	8 7	8·5	7·5	6·25	3·3	
Weight of Firing Charge, Armour-piercing Projectile lb.	..	..	..	..	..	..	..	..	..	
Weight — Armour-piercing Projectile lb.	2190	1400	250	100	100	100	100	82	45	(8) Ise Class. Mutsu Class. Kuma Class. Tenryu Class.
Weight — Common Shell ,,	..	..	..	..	..	..	..	..	..	
Muzzle Velocity, in f.-s., A.P. Projectile	2780	2526	2740	3000	3000	2130	3000	2725	2988	(9) Tone. Yodo. Mogani.
Muzzle Energy in foot-tons	118,000	62,500	13,100	6300	6300	3165	6300	4250	2810	
Perforation at Muzzle,† wrought iron, inches	65	48·2	30·5	25·5	25·5	18·3	25·5	20·8	19·2	
Perforation Krupp Steel, 3000 yds.	13·8 at 10,970 metres	..	10½	6½	6½	4½	6½	..	2½	

† By Tresidder's Formula.

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BETHLEHEM STEEL CO.

SHIP AND COAST-DEFENCE GUNS.

Table returned by the Manufacturers, August, 1927.

Calibre.		Length of bore.	Weight of gun, including breech mechanism.		Weight of projectile.		At Muzzle.						Type of Ammunition.
							Velocity.		Energy.		Penetration of steel-plate (De Marre).		
inches.	millimetres.	calibres.	lbs.	kgs.	lbs.	kgs.	ft. per sec.	metres per sec.	foot-tons.	metre-tons.	inches.	milli-metres.	
1·457	37	about 50	160	72·5	1·07	0·48	2,150	655	34	10·5	2·04	51·8	Fixed in cartridge case.
1·850	47	about 50	550	249·5	3·3	1·5	2,400	732	132	41	4·11	104·4	,, ,,
2·244	57	50	960	435·5	6·07	2·75	2,400	732	243	75	5·17	131·3	,, ,,
3	76	50	1950	884·5	13	5·9	2,700	823	658	204	7·71	195·8	,, ,,
			tons.										
4	102	50	2·6	2,642	33	15	2,800	853	1,795	557	11·61	294·9	,, ,,
4	102	50	2·6	2,642	30·86	14	3,000	914	1,928	597	12·22	310·4	,, ,,
5	127	51	5·0	5,080	50	22·7	3,150	960	3,440	1,067	14·56	369·8	Separate, with powder in bag.
6	152	45	7·0	7,112	105	47·6	2,600	792	4,926	1,523	15·47	392·9	Separate, with cartridge case.
6	152	50	8·4	8,534	105	47·6	2,800	853	5,713	1,767	17·19	436·6	Separate, with powder in bag.
6	152	53	10·1	10,260	105	47·6	3,000	914	6,559	2,028	18·97	481·8	,, ,, ,,
7	178	45	12·7	12,900	165	74·8	2,700	823	8,348	2,584	19·11	485·4	,, ,, ,,
7	178	50	14·5	14,730	165	74·8	2,900	884	9,631	2,982	21·16	537·5	,, ,, ,,
8	203	45	18·6	18,900	260	118	2,800	853	14,148	4,379	24·15	613·4	,, ,, ,,
8	203	50	22·3	22,660	260	118	2,900	884	15,177	4,703	25·38	644·6	,, ,, ,,
9·2	234	50	30·4	30,890	380	172	2,900	884	22,181	6,856	28·66	727·9	,, ,, ,,
10	254	45	35·4	35,970	515	234	2,800	853	28,023	8,685	30·97	786·6	,, ,, ,,
10	254	50	43·9	44,600	515	234	2,900	884	30,061	9,327	32·56	827·0	,, ,, ,,
12	305	45	53·8	54,660	870	395	2,800	853	47,341	14,660	37·05	941·1	,, ,, ,,
12	305	50	57·5	58,400	870	395	2,900	884	50,783	15,745	38·95	989·3	,, ,, ,,
14	356	45	64·6	65,650	1,400	635	2,600	792	65,687	20,317	39·69	1008·0	,, ,, ,,
14	356	50	79·4	80,700	1,400	635	2,800	853	76,181	23,567	44·12	1121	,, ,, ,,
15	381	45	86·5	87,880	1,700	771	2,600	792	79,763	24,668	42·35	1076	,, ,, ,,
16	406	45	105·0	106,500	2,100	953	2,600	792	98,530	30,491	45·95	1167	,, ,, ,,
16	406	50	128·0	130,200	2,100	953	2,800	853	114,272	35,369	51·08	1297	,, ,, ,,
16	406	50	140·0	142,400	2,330	1,057	2,700	823	117,900	36,500	52·39	1331	,, ,, ,,
18	457	45	150·0	152,400	3,330	1,510	2,450	747	138,734	42,979	51·71	1313	,, ,, ,,

Guns of 4·7-in. calibre and under, equipped with the wedge-type breech mechanism, are supplied with an automatic breech-opening device, if desired.

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GERMAN SHIP AND COAST GUNS.

This list of Krupp guns was corrected in September, 1921. It is preserved here as a record of the guns which were produced at Essen shortly before the war, and during its course up to the time when the provisions of the Armistice came into force. Under the Peace Treaty the delivery of German war material abroad is interdicted. The most important of the new guns were those of heavy calibres: 16 in., 18 in. and 20 in. The pre-war table showed no guns of greater length than 40 calibres below the 11 in. The Essen Company always attached the greatest importance to the endurance and performances of its heavy guns. The light cruiser Dresden, which has been laid down at Wilhelmshaven, will have 6-in. or 5·9-in. guns.

Calibre . . . . . cm.	7·5 = 2·9 in.		8·8 = 3·4 in.		10·5 = 4·1 in.		15 = 5·9 in.		21 = 8·2 in.		24 = 9·4 in.		28 = 11 in.	
Length of Bore . . . . cals.	45	50	45	50	45	50	45	50	45	50	45	50	45	50
Length of Bore . . . . mm.	3375	3750	3960	4400	4725	5250	6710	7455	9420	10465	10800	12000	12600	14000
Total Length . . . . ,,	3570	3945	4190	4630	5000	5525	7100	7845	9965	11010	11425	12625	13330	14730
Weight of Gun . . . . kg.	760	780	1225	1260	2095	2140	5970	6120	14600	15440	21950	23250	34900	36900
Weight of Projectile . . ,,	5·8	5·8	9·5	9·5	16	16	46	46	125	125	190	190	300	300
Weight of Charge . . . ,,	1·84	1·84	2·97	2·97	5·05	5·05	14·4	14·4	38·8	38·8	58·3	58·3	92·7	92·7
Muzzle Velocity . . . m/sec.	850	875	850	875	850	875	850	875	850	875	850	875	850	875
Muzzle Energy . . . . mt.	213·5	226·5	350	371	590	625	1694	1797	4610	4880	7000	7420	11040	11700
Muzzle Penetration (Steel) mm.	206	215	247	258	297	310	433	452	616	642	717	747	842	878

Calibre . . . . . cm.	30·5 = 12 in.		35·56 = 14 in.		38·1 = 15 in.		40·64 = 16 in.		45·72 = 18 in.		50·8 = 20 in.	
Length of Bore . . . . cals.	45	50	45	50	45	50	45	50	44	50	45	50
Length of Bore . . . . mm.	13725	15250	16000	17780	17145	19050	18290	20320	20575	22860	22860	25400
Total Length . . . . ,,	14520	16045	16925	18705	18135	20040	19345	21375	21765	24050	24180	26720
Weight of Gun . . . . kg.	45100	47700	70000	75200	86100	92500	104300	112200	148300	159500	204000	219000
Weight of Projectile . . ,,	390	390	620	620	760	760	920	920	1310	1310	1805	1805
Weight of Charge . . . ,,	120	120	190	190	233	233	284	284	402	402	553	553
Muzzle Velocity . . . m/sec.	850	875	850	875	850	875	850	875	850	875	850	875
Muzzle Energy . . . . mt.	14350	15230	22800	24200	27950	29650	33900	35950	48250	51200	66500	70500
Muzzle Penetration (Steel) mm.	927	967	1095	1142	1177	1227	1259	1312	1428	1488	1600	1668

No gun larger than 11 in. is now mounted.

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SIZE AND FIGHTING QUALITIES OF BRITISH CAPITAL SHIPS OF DIFFERENT PERIODS.

Name.	Date of Completion.	Displacement.	Side Armour.	Speed.	Total Weight of Shot in One Round.	Collective Energy at Muzzle of One Round.
		tons.	in.	knots.	lb.	foot-tons.
Warrior	1861	9,210	4½-in. wrought-iron	14½	3,800	61,476
Hercules	1868	8,680	9-in. to 6-in. wrought-iron	14	5,400	70,200
Alexandra	1877	9,490	12-in. to 6-in. wrought-iron	15	5,426	71,400
Inflexible	1881	11,880	24-in. to 16-in. wrought-iron	13	6,936	123,120
Benbow	1888	10,600	18-in. compound	16·75	4,600	135,560
Royal Sovereign	1892	14,150	18-in. and 5-in. compound	17·5	5,800	159,610
Barfleur	1894	10,500	12-in. compound	18·5	2,450	67,670
Canopus	1900	12,950	6-in. hardened steel	18·25	4,600	178,720
Prince of Wales	1902	15,000	9-in. super-hardened steel	18·25	4,600	194,400
King Edward VII.	1905	16,350	9-in. hardened steel	19	6,100	271,800
Dreadnought	1906	17,900	11-in. hardened steel	21	8,800	487,100
Neptune	1911	20,600	12-in. hardened steel	21·5	8,900	545,000
Ajax	1913	25,000	12-in. hardened steel	21·5	14,500	625,000
Queen Elizabeth	1915	27,500	13-in. hardened steel	25	15,360	688,000
Royal Sovereign	1916	25,750	13-in. hardened steel	23	15,360	688,000
Hood	1920	41,200	13-in. hardened steel	31	15,360	688,000
Nelson	1927	35,000	—	23	19,170	919,440

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PARTICULARS OF SUCCESSIVE LARGE BRITISH NAVAL GUNS, 1800 TO 1928

Year.	Type.	Weight.	Length.	Calibre.	Weight of Projectile.	Weight of Charge.	Muzzle Energy.	Penetration of Wrought-iron at 1000 yards range.
		tons. cwt.	in.	in.	lb.	lb.	ft.-tons.	in.
1800	Cast-iron smooth-bore . .	2 12	114	6·4	32	10	400	—
1842	Ditto	4 15	—	8·12	68	16	700	—
1865	Woolwich wrought-iron .	4 10	—	7	115	22	1,400	7
1870	Built-up muzzle-loader . .	38 0	200	12·50	810	200	13,900	17
1880	Ditto	80 0	321	16	1700	450	27,960	22½
1887	Built-up breech-loader . .	110 10	524	16·25	1800	960	54,390	32
1895	Wire-wound breech-loader .	46 0	445·5	12	850	—	33,940	34·6
1900	Ditto	51 0	496·5	12	850	210	36,290	35·4
1905	Ditto	58 0	558	12	850	—	47,700	46·2
1912	Ditto	76 0	626	13·5	1400	—	60,600	*50
1914 to 1920	Ditto	96 0	675	15	1920	—	84,070	*56
1921	Ditto	117 0	720	16	2240	—	93.230	*57
1928	Ditto	83 0	720	16	2130	580	102,160	*60

* At muzzle. Guns of 18-in. calibre were fitted to one cruiser during the War, but were subsequently removed and used in monitors.

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NAVAL REFERENCE SECTION.

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STATEMENT OF THE FIRST LORD OF THE ADMIRALTY TO ACCOMPANY THE NAVY ESTIMATES, 1928.

THE net total of Naval Estimates for 1928 is £57,300,000. This is £700,000 less than the original estimate of £58,000,000 for the current year, and £1,150,000 less than the figure as amended by the Supplementary Estimate now found to be necessary.

The net reduction would have been substantially greater, were it not for a considerable falling off in the Appropriations in Aid, due in large part to there being fewer obsolete ships to dispose of, and the continued shrinkage in the quantities of stores available from stock in relief of cash expenditure. These adverse circumstances, which are outside the control of the Admiralty, by far outweigh the fact that it is not necessary to provide as last year, for an extra pay-day or for abnormal conditions due to the Coal Stoppage.

The provision included on account of the New Construction Programme is £9,629,857 as against £9,983,446 in 1927 and £9,083,693 in 1926. Had the full Programme been proceeded with, the provision required in 1928 would have been at least £10,700,000. This considerable reduction is due to the fact that His Majesty's Government have reduced the Programme by two Cruisers in 1927 and by one Cruiser in 1928.

On the other hand, the provision for the Fleet Air Arm is increased by £198,000, chiefly because two new flights of aircraft must be formed in 1928 for training purposes in anticipation of the completion of the reconstruction of the Glorious as an Aircraft Carrier.

In the preparation of these Estimates, the continued placidity of the general Naval situation has been constantly in our minds, and many important services have either been deferred entirely or are being provided at a leisurely rate which the expectation of a prolonged period of peace alone warrants.

It is natural that the considerable reductions in maintenance charges which have been effected in the past three years should make it increasingly difficult to effect further additional savings on a large scale. But the fact that I am able to ask for a smaller Vote A than in 1927 and for £538,000 less for the maintenance of the Fleet is proof that there is no relaxation in our efforts to secure the most rigorous economy.

I should add that, as in 1927, so in these Estimates, a large allowance has been made for possible underspending on contract work. I have explained to Parliament on other occasions that this policy carries with it the risk that a Supplementary Estimate

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may be necessary—as has, indeed, proved to be the case in the present year. But on the general experience of recent years, it has been considered justifiable to continue to make an overhead deduction on the provision for work of this description.

W. C. BRIDGEMAN.

ADMIRALTY.
March 5, 1928.

NOTES ON MATTERS OF GENERAL INTEREST.

GENEVA NAVAL CONFERENCE.

In February 1927 the President of the United States of America issued a memorandum to the Governments of the Powers Signatories of the Washington Treaty stating his conviction that the competitive augmentation of national armaments had been one of the principal causes of international suspicion and ill-will leading to war, and his anxiety that concrete results in the limitation of armaments might be achieved, and enquiring whether they were disposed to empower their representatives at the then forthcoming meeting of the Preparatory Commission for the Disarmament Conference to inititate negotiations towards an agreement providing for limitation in the classes of naval vessels not covered by the Washington Treaty.

After consultation with the Dominions this invitation was readily accepted by His Majesty's Government in Great Britain, which, after drawing attention to the special position and needs of the British Empire, stated that it was prepared to consider to what extent the principles adopted at Washington could be carried further, either as regards the ratio in different classes of ships between the various Powers or in other important ways. As a matter of fact, the Admiralty had been at work for some months on certain proposals for the further limitation of naval armaments and had already submitted a request to the Prime Minister that steps might be taken to ascertain whether a conference could be summoned for their consideration by Powers Signatories of the Washington Treaty.

A Conference was accordingly arranged to take place in June between delegates of the British Empire, United States of America and Japan—France and Italy having found themselves unable to take part, except in the capacity of Observers.

At this Conference our proposals, with which all the Governments of His Britannic Majesty were in agreement, were designed to make a further step in the progressive decrease of armaments by reducing the general standard of naval armaments without affecting the relative security of the several nations at sea.

We therefore proposed to extend the life and reduce the tonnage and armament of those classes of warships already limited by the Washington Treaty, which would have reduced the cost of replacement very considerably. Limitation in the size and armament of the other classes of warships and ages for replacement were also proposed, in order to secure economy in the replacement of ships as they became obsolete and to eliminate the danger of rivalry in new vessels by a reversion to that competition which was, before the Washington Treaty, exemplified in the continual increase in size of battleships.

In the discussions which followed, we stated with complete frankness our naval requirements and outlined the considerations of defence on which they were based. Nevertheless, though much common ground was found, it was unfortunately found impossible to agree upon a formula acceptable to all parties and, to our regret, the Conference terminated without arriving at an agreement.

DISTRIBUTION OF THE FLEET.

The redistribution of Battleships between the Mediterranean and Atlantic Fleets to which I alluded in last year's statement is now almost complete. The two new battleships H.M.S. Nelson and H.M.S. Rodney have joined the Atlantic Fleet. H.M.S. Revenge, the last of the "Royal Sovereign" Class to be transferred from the Atlantic Fleet, will join the Mediterranean Fleet during the coming year.

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The battleships and battle cruisers comprised in the Mediterranean and Atlantic Fleets during 1928 will be :—

Mediterranean Fleet.

Four ships of the " Queen Elizabeth " Class.
Four or five ships of the " Royal Sovereign " Class.
The fifth ship of the " Queen Elizabeth " Class will be at home undergoing large repairs.
The fifth ship of the " Royal Sovereign " Class will also be undergoing repairs the greater portion of the year.

Atlantic Fleet.

Two ships of the " Nelson " Class.
Three ships of the " Iron Duke " Class.
Three Battle Cruisers.
The fourth ship of the " Iron Duke " Class will be undergoing large repairs.

H.M.S. Courageous, which is being reconstructed as an improved type of aircraft carrier, will be completed and will join the Mediterranean Fleet in the near future.

H.M.S. Hermes, aircraft carrier, has been allocated to the China Station, and the aircraft carrier Argus, which has been detached for some time from the Atlantic Fleet for service in China, will shortly rejoin the Atlantic Fleet.

The new Cruiser Minelayer Adventure has now joined the Atlantic Fleet. The Centurion has been converted into a target ship to replace the Agamemnon.

The first two of the new " Kent " Class cruisers have sailed for China to relieve H.M.S. Vindictive, and it is anticipated that by July the five cruisers of this class will have relieved the cruisers now on that Station.

The first four cruisers of the " London " Class will, when completed, relieve cruisers now serving on the Mediterranean Station.

During the past year the limits of the North America and West Indies Station have been extended to include South America, and the Station has been renamed the " America and West Indies Station." In order to meet the requirements of the enlarged station, it has been decided to augment this squadron by the transfer of H.M.S. Dauntless from the Mediterranean. This addition will make it possible for the British Flag to be shown in South American Waters more regularly than has been the case since the withdrawal of the South American Squadron for financial reasons in 1921.

The two new destroyers Amazon and Ambuscade will make a cruise to South American waters from April to August 1928 before joining the Fleet in replacement of two older vessels to be placed in reserve.

The 8th Destroyer Flotilla has now been permanently allocated to the China Station.

An important scheme has been adopted by which all reserve destroyers, other than those attached to training establishments, the emergency destroyers at Home Ports, and destroyers held available for replacement purposes in running flotillas, are placed in maintenance reserve at Rosyth, under conditions which are expected to effect considerable economy in the cost of maintenance.

The Submarine Oberon was completed at Chatham in August last, and has since been engaged in carrying out the extensive trials usual in the first vessel of a new type.

The first two of the four River Gunboats begun in 1925, the Peterel and the Tern, have been commissioned at Hong Kong and will be sent to the Yangtse. The other two will shortly be completed and commissioned at Hong Kong, and one of these will also proceed to the Yangste. On the arrival of these new gunboats, three of the old worn-out gunboats will be paid off and disposed of.

Co-operation with the Dominions.

No exchange of Royal Australian Navy and Imperial Cruisers has been arranged for 1928 as the Melbourne is due in this country shortly to turn over her crew to the new Australian Cruiser Australia. The system of exchanges will be resumed in subsequent years.

Two destroyers—the Torbay and the Toreador—have been lent to the Canadian Government, and have been re-named Vancouver and Champlain. They will replace H.M.C.S. Patriot and H.M.C.S. Patrician.

Fleet Activities Abroad.

Red Sea.—The sloops in the Red Sea have been employed on patrol for the prevention of the slave traffic. Two destroyers from the Mediterranean Fleet were also employed during December and January on slave traffic prevention.

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China.—During the past year the situation in China, from a naval point of view, has become less exacting. With the arrival of the Shanghai Defence Force and its establishment in Shanghai, the need for the large cruiser reinforcements disappeared, and these have now been withdrawn to their respective stations.

The 3rd Destroyer Flotilla has been retained for service on the Yangtse until the river level rises and again permits cruisers to reach Hankow, when it is hoped that the Flotilla will be able to rejoin the Mediterranean Station.

Excellent work has been carried out by the Fleet Air Arm Units in China, and a very high standard of skill has been displayed when operating from the small Aerodrome at Shanghai, and with seaplanes from the congested waters of the Shanghai River and Hong Kong Harbour.

The 12th Royal Marine Battalion, which was the first part of the Shanghai Defence Force to be sent from England, has been employed during the year at Shanghai and Nanking. Owing to the improvement in the situation, it was found possible to reduce this Battalion from time to time, and finally the residue of officers and men returned to England in January last, having thus been absent from this country for practically a year.

Unfortunately, the prevalence of piracy both on the high seas and in the inland waterways of China has continued. Direct intervention, however, on the part of the Navy was possible in one recent case on the high seas and has been followed by a remarkable cessation of the trouble in this sphere.

Fishery Protection.

As in previous years, the Fishery Protection Vessels have paid visits to foreign ports, including those as far distant as Norway and Iceland, while visits have been received from four foreign Fishery Protection Vessels.

This interchange of visits contributes largely towards maintaining the good relations existing between sea fishermen and Fishery Protection Vessels of the various nations.

Relations between our own Fishery Protection Service, the fishing industry, and the fishing districts in general continue to be excellent.

General Fleet Training.

Good progress has been made in the tactical training of the Fleet.

As a result of the experience gained in Fleet and minor exercises, the Commanders-in-Chief, Mediterranean and Atlantic Fleets, are taking the opportunity afforded by the meeting of the fleets at the combined exercises to revise and bring into line with modern developments various tactical methods which have been under investigation.

The development of Naval Anti-Aircraft gunnery has been continued with further satisfactory results and progress is being made in providing equipment for the Fleet.

The advance in mining and anti-mining and the development of anti-submarine tactics have been steady and continuous.

Naval Air Work.

Considerable progress has been made in the employment of aircraft with the Fleet, and the number of hours flown from the carriers has increased considerably.

107 Naval and Royal Marine Officers are now trained and being employed as Pilots in the Fleet Air Arm, and 23 more are under training.

65 Naval Officers have been trained as Observers and 11 more are under training.

A Catapult has been installed in the Resolution in addition to the Vindictive. A number of different types are under manufacture or design with a view to comparative trials to determine the types suitable for the various classes of vessels.

Wireless Telegraphy and Signal Development.

Short-wave long-distance communications have been further developed during the past year. All ships on distant stations are fitted with short-wave apparatus and there is no ship which cannot be reached from the Admiralty during some part of the 24 hours.

Short-wave gear at Admiralty shore stations has been improved and efficient point-to-point working is maintained during many hours of the day between the Admiralty and Hong Kong, Singapore, Ceylon, etc.

These improvements have resulted in a considerable reduction in expense, since communication by cable is now rarely necessary.

These lines of communication have been of the greatest value during the troubles in China.

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Fleet Communications.

The rapid advances in wireless technique are being used to improve all forms of Fleet communications, on the efficiency of which depends very largely the power of making full use of modern weapons.

International Radio Conference.

An International Radio-telegraph Conference was held at Washington in November of last year.

The Convention, which was signed by the 74 Governments represented, necessitates minor changes in our naval wireless organisation and material, which will be carried out during the coming year. On the other hand, the Navy will benefit, in common with all users of wireless waves, by this International adoption of various rules and regulations for the use of wireless telegraphy and telephony, the chief among which fixes the allocation of the various wave bands to the different uses concerned, such as Point-to-Point, Shore to Ship, Broadcasting, Air, Amateurs, etc.

Co-operation between the Services.

The policy of collaboration between the Services in respect of training continues to be followed, and a number of small combined exercises have been carried out. The Navy is also in close touch with the Army and Royal Air Force in all wireless and kindred matters.

Arrangements were made during the year for a small number of Naval Officers to be attached to the Army for various manœuvres and exercises, and a corresponding number of Army Officers were accommodated on board H.M. Ships during the more important Fleet exercises. These arrangements, which it is hoped to repeat in the future, are in addition to the facilities in this direction already given to officers undergoing the various Staff courses.

The first course at the Imperial Defence College finished in December 1927 and the second course commenced in January. There is reason to expect very useful results in developing co-operation between the Services.

Singapore Base.

Expenditure at the Singapore Naval Base is being mainly confined to the continuation of the Works involved in the installation of the floating dock and the investigations and preliminary works connected with the New Base.

As intimated last year, the Government have proceeded with the work on the reduced scheme and full particulars have been prepared for letting a Contract. Certain Contractors have been invited to tender for what may be called the heavier or main portion of the work. The tenders are due at the end of March.

Arrangements have been made to commence the towage of the Singapore Floating Dock from the United Kingdom about June. The dock should arrive at Singapore about November, and be ready for use about four months later.

Last year I mentioned gratefully the contribution made by the Federated Malay States towards the cost of the Base. This year, in addition, an instalment of the Dominion of New Zealand's gift of £1,000,000 goes to reduce the charges which would otherwise fall upon these Estimates.

Personnel.

Owing to the reduction in the building programme and other economies it has been found possible to reduce the personnel of the Fleet, and the final figure for the year 1928 will be 100,986, *i.e.*, a reduction of 1,289 compared with Vote A for 1927, which was 102,275.

As this reduction can only be effected gradually during the year, the Vote A for 1928, *i.e.*, the maximum number to be borne on any one day, is 101,800, which is the number estimated to be borne on April 1, 1928

The Flag List, by the absorption of a final vacancy, has now been reduced to its fixed numbers.

The Royal Marine Corps has, as a measure of economy, been reduced in Establishment by three Lieutenant-Colonels.

The special voluntary retirement scheme for Lieutenant-Commanders referred to in the Statement of 1927 closed in June 1927. The number of officers retiring under the scheme was 66.

Under the arrangements for the periodical review of rates of pay due to changes in the cost of living, the rates of pay of officers of the Royal Navy and Royal Marines came under review on July 1, 1927, in common with those of officers of other fighting services, the rates as a result being fixed at approximately 6 per cent. below the 1919 rates, as compared with the 5½ per cent. for the three years preceding.

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From Funds supplied from private sources, two new prizes for Naval Officers have been instituted. One of these will be awarded annually to the Naval Observer who has completed his training as such and who submits the best essay on some subject specially set each year dealing with the work and development of the Fleet Air Arm. The other will be awarded annually to the Officer who passes the best final examinations in the qualifying course for Signal Officers. The first of these will be known as the "Henry Leigh Carslake Prize," and has been given in memory of the officer of that name who lost his life in October 1926 in a flying accident when on duty as a Naval Oberver. It is interesting to note that the first award of the second prize, which will be known as the "Jackson-Everett Prize," has been made to an Officer of the Royal Australian Navy.

The grading and emoluments of the teaching staff of the Royal Naval College, Dartmouth, have been placed upon a revised footing to bring them into line with the general practice of the teaching profession. This was necessary in order that the service might continue to attract the right type of masters.

The alterations to the former Royal Marine Barracks at Forton, to render them suitable for the training of Seaman Class boys, have now been completed. The establishment was opened in June 1927 under the name of H.M.S. St. Vincent, and is proving a valuable addition to our training resources.

A commencement is to be made with the provision of accommodation for Artificer apprentices at Chatham with a view to the transfer thither of the training of the apprentices in the Mechanical Training Establishment at Portsmouth (H.M.S. Fisgard). This has been decided upon as the workshops of the Fisgard are inadequate and out of date.

Arrangements are being made to enable boys of good education to join the Navy by means of an entrance examination, the passing of which will ensure their direct entry into the Advanced Class at the Boys' Training Establishments. The Advanced Class is designed to provide a special education for all boys, whether entered under this system or the existing system, who have reached a certain educational standard, in order that they may be able to take the fullest advantage of the technical and professional instruction which is given in the Service, and to pass the examinations which are a condition of advancement to higher positions. The first entries under this scheme will be made in October as a result of the examination to be held in July 1928.

The income of the Travers Foundation formerly provided for the College of Naval Knights of Windsor (which was abolished by Act of Parliament in 1892) is now spent on the provision of pensions of £75 a year for officers retired from the rank of Lieutenant or Lieutenant-Commander. In recent years the income has been more than sufficient to pay for the number of pensions hitherto granted, and, after a review of the available resources of the Foundation, it has been decided to increase the number of these pensions permanently from 21 to 29, and to grant a further two pensions until the present accumulated balance is exhausted. At a time when there is an unprecedented number of officers of this rank on the Retired List, these additional pensions are much wanted.

Matériel. New Construction.

Like the Battleships Nelson and Rodney, the new Cruisers and Destroyers mark an important advance in the attainment of greatly improved fuel economy by the employment of superheated steam and other features in modern design. The Cruiser design marks a further advance in the subdivision of the main propelling machinery into four self-contained units.

Advance also continues to be made in reducing weight and improving the durability of the machinery. The last named feature assumes greater importance owing to the adoption of the policy of increased self-maintenance afloat, which is developing satisfactorily.

Work on the problems of fuel consumption and the production of improved refractories and furnace fittings has been actively pursued and useful data for the use of the service afloat have been obtained.

Of the "Kent" Class Cruisers the Berwick and Cumberland have been delivered by the Contractors.

The Kent (building at Chatham), the Suffolk (Portsmouth) and the Cornwall (Devonport) are nearly completed.

As a result of experience during trials the funnels of the "Kent" Class Cruisers have been lengthened and some minor machinery changes which the trials indicated to be desirable have also been made.

Of the "London" Class the London and the Devonshire were launched at Portsmouth and Devonport in September and October 1927 respectively and are expected to be completed in December next.

The Sussex was launched February 22, 1928, and is expected to be completed early in the financial year 1929.

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The Shropshire is expected to be launched in the summer.

Of the "Dorsetshire" Class the Dorsetshire, building at Portsmouth, and the Norfolk, building by the Fairfield Co., are making satisfactory progress.

The "B" Class Cruiser York, building by Messrs. Palmer is progressing normally and is expected to be launched in the summer of 1928.

The new "B" Class Cruiser of the 1927 Programme will be built at H.M Dockyard at Devonport, and is to be named the Exeter.

Orders for the Flotilla Leader and 8 Destroyers of the 1927 Programme have been placed.

Some delay has been incurred in the 1928 "O" Class Submarines, where it has been considered necessary, as a result of the torsional vibration experienced in Oberon and the investigations following this experience, to make an important modification in the design of the motor shafts. In this connection, one of the 1926 Submarines is being fitted with a design of hydraulic clutch in lieu of the mechanical clutch usually fitted between the oil engines and the motor, to improve the flexibility and durability of these fast-running highly stressed oil engines. Similar provison has been made for the six 1927 Submarines, the orders for which have been placed. It was decided to construct one of these at Chatham Yard, and this vessel was started on January 2 last.

New Programme.

The New Programme for 1928 includes provision for commencing the construction of the following new ships:

2 Cruisers.
1 Submarine Depôt Ship.
1 Flotilla Leader.
8 Destroyers.
6 Submarines.
1 River Gunboat.
4 Sloops.

The two Cruisers and one Submarine will be built in H.M. Dockyards.

This programme provides for two Cruisers instead of the three Cruisers contained in the Programme as set forth in Command Paper 2476, dated July 27, 1925. On the other hand, the Sloops are additional to the original Programme. In my Explanatory Statement last year I explained the need for the replacement of the existing Sloops and Minesweepers.

Reconstruction and Repairs.

The Malaya is now in hand at Portsmouth for refit and bulging. The Valiant will be taken in hand for bulging on completion of the Malaya.

The Courageous, which is undergoing reconstruction as an Aircraft Carrier at Devonport, is expected to be completed towards the end of the present financial year. Her sister vessel, the Glorious, which is being similarly reconstructed at Devonport, is expected to complete in 1929.

Dockyard Administration.

An important Committee was set up by the Board last spring to make a comprehensive review of the financial system of the Dockyards, on a scale which had not been attempted since the Mills-Waterhouse Report of 1889. The Committee was ably presided over by Mr. R. S. Hilton, then Deputy Chairman of the Metropolitan Vickers Electrical Company, and included the Director of Dockyards and other experts drawn from inside and outside the service. The Committee has made a series of very valuable recommendations, with the object of bringing the Dockyard financial system up to the most modern standards developed in outside industry.

Miscellaneous.

With a view to the provision of means for preventing the pollution of harbours by oil the Admiralty has maintained close touch with the commercial world in regard to designs of separators, and three separators have been tried under Service auspices, two of which have been purchased for harbour use at Portsmouth and Devonport. An Admiralty design is also under construction.

The development of the use of pulverised fuel ashore and afloat is being carefully watched.

Trials of the oils produced from the low temperature distillation of coal are being carried out to test their suitability for Service purposes, either alone or blended with petroleum base oils.

W. C. B.

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ABSTRACT OF NAVY ESTIMATES FOR 1928.

Votes.		Estimates 1928. Gross Estimate.	Estimates 1928. Net Estimate.	Estimates 1927. Net Estimate.
	I.—Numbers.		Maximum Numbers.	Maximum Numbers.
A.	Number of Officers, Seamen, Boys, and Royal Marines	101,800	101,800	102,275
	Number of Royal Marine Police	450	450	450
	II.—Effective Services.	£	£	£
1	Wages, etc., of Officers and Men of the Royal Navy, and Royal Marines, and Civilians employed on Fleet Services	14,513,942	14,445,700	14,715,300
2	Victualling and Clothing for the Navy	4,942,418	4,062,000	4,261,600
3	Medical Establishments and Services	501,381	442,400	452,900
4	Fleet Air Arm	1,080,000	1,080,000	882,000
5	Educational Services	319,163	236,300	240,700
6	Scientific Services	503,894	432,500	438,000
7	Royal Naval Reserves	412,842	412,500	426,600
8	Shipbuilding, Repairs, Maintenance, etc.:			
	Section I.—*Personnel*	6,958,514	6,852,000	7,146,000
	Section II.—*Matériel*	6,623,700	5,188,500	5,024,800
	Section III.—Contract Work	8,288,950	8,025,200	8,643,700
9	Naval Armaments	4,383,228	3,883,600	3,341,700
10	Works, Buildings, and Repairs at Home and Abroad	2,225,000	1,805,000	1,907,000
11	Miscellaneous Effective Services	819,170	767,500	805,000
12	Admiralty Office	1,206,120	1,197,000	1,238,000
	Total Effective Services £	52,778,322	48,830,200	49,523,300
	III.—Non-Effective Services.			
13	Naval and Marine, Officers	3,029,963	3,004,000	2,943,700
14	Naval and Marine, Men	4,554,050	4,518,500	4,571,000
15	Civil Superannuation, Compensation Allowances, and Gratuities	948,280	947,300	962,000
	Total Non-Effective Services £	8,532,293	8,469,800	8,476,700
	Grand Total £	61,310,615	57,300,000	58,000,000

Net Decrease . . . . £700,000.

Admiralty, *Feb.* 27, 1928.

W. C. Bridgeman. M. H. Hodges. W. W. Fisher. Dudley Pound.
Chas. E. Madden. A. E. M. Chatfield. F. L Field. Stanhope.
Cuthbert Headlam } Secretaries.
O. Murray }

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STATEMENT SHOWING THE NUMBERS BORNE, THE EXPENDITURE ON NAVAL SERVICES FOR THE YEARS 1917 TO 1926, AND THE ESTIMATES FOR 1927 AND 1928.

Year.	Vote A. — Average numbers borne. (a)	Vote 1. — Wages, &c., of Officers, &c.	Vote 2. — Victualling and Clothing.	Vote 3. — Medical Establishments, &c.	Vote 4. — Civilians employed on Fleet Services.	Vote 5. — Educational Services.	Vote 6. — Scientific Services.	Vote 7. — Royal Naval Reserves.	Vote 8. Shipbuilding, Repairs, Maintenance, &c.			Vote 9. — Naval Armaments.	Vote 10. — Works.	Vote 11. — Miscellaneous.	Vote 12. — Admiralty Office.	Vote 13. — Half Pay, &c.	Vote 14. — Naval, &c., Pensions.	Vote 15. — Civil Superannuation, &c.	Balances Irrecoverable.	Total Expenditure.
									Section I. Personnel.	Section II. Matériel.	Section III. Contract Work.									
1917	406,977	£ 37,559,536	£ 13,481,159	£ 792,569	£ 561,308	£ 210,243	£ 152,160	£ 874,930	£ 12,660,160	£ 36,494,694	£ 70,609,055	£ 34,177,359	£ 6,556,799	£ 9,193,802	£ 1,454,835	£ 709,227	£ 1,446,247	£ 413,746	£ 41,092	£ 227,388,891
1918	381,311	46,373,511	24,219,351	1,158,287	491,270	247,922	262,886	871,970	15,037,763	59,128,675	94,248,874	64,866,784	10,928,241	9,357,532	1,985,894	704,914	3,733,778	445,485	28,090	334,091,227
1919	176,087	32,385,306	8,823,106	733,046	556,778	401,864	364,832	458,044	12,426,177	*Credit* :— 785,986	48,348,933	14,441,835	5,595,608	11,118,631	2,042,715	1,176,937	15,133,064	802,279	60,875	154,084,044
1920	124,009	21,314,360	8,311,738	38,330	759,110	503,152	249,185	359,694	12,096,747	6,799,965	12,001,445	8,493,951	4,992,969	5,724,974	2,073,764	2,352,344	4,847,475	880,996	23,611	92,505,290
1921	127,180	19,220,859	6,831,481	643,735	480,243	405,592	359,575	423,056	10,690,188	8,835,771	4,834,336	6,253,468	4,746,485	3,506,514	1,780,641	2,002,201	3,881,368	1,020,693	69,935	75,986,141
1922	107,782	15,762,232	4,767,118	492,419	258,600	382,065	354,961	423,722	7,075,533	3,877,716	3,225,598	3,678,783	3,553,831	2,096,219	1,371,961	Non-effective Services. Officers. 3,701,984	Men. 5,471,088	968,880	29,679	57,492,389
1923	99,107	14,175,111	4,153,803	410,842	193,793	330,644	379,489	459,391	6,751,496	5,521,336	4,427,874	3,840,606	3,215,766	982,173	1,247,813	2,856,764	4,260,245	823,340	33,864	54,064,350
1924	99,453	14,150,863	4,152,902	442,756	190,669	334,648	393,054	446,902	7,489,659	5,592,183	5,415,210	3,507,190	3,140,887	1,065,869	1,349,519	2,868,798	4,328,526	811,797	12,355	55,693,787
1925	100,284	14,576,499	4,226,570	440,209	Fleet Air Arm (b) 1,320,000	327,226	417,552	465,114	7,929,259	6,905,184	6,395,406	4,247,113	2,422,050	826,119	1,307,790	2,812,336	4,449,585	928,326	8,110	60,004,548
1926	100,791	14,322,678	4,236,846	434,919	681,000	324,036	393,339	444,759	7,487,952	5,422,141	7,275,173	3,595,037	2,108,441	930,369	1,203,639	2,914,419	4,450,140	894,472	23,002	57,142,862
1927 (Estimate)	102,725(c)	14,715,300	4,261,600	452,900	882,000	240,700	438,000	426,600	7,146,000	5,024,800	8,643,700	3 341,700	1,907,000	805,000	1,238,000	2,943,700	4,571,000	962,000	—	58,000,000
1928 Estimate)	101,800(c)	14,445,700	4,062,000	442,400	1,080,000	236,300	432,500	412,500	6,852,000	5,188,500	8,025,200	3,883,600	1,805,000	767,500	1,197,000	3,004,000	4,518,500	947,300	—	57,300,000

(a) Exclusive of Royal Marine Police.

Note.—The figures under Vote 9 for the years 1918 and 1919 include the cost of Naval Aviation Services.

(b) Replacing "Civilians employed on Fleet Services," transferred to Vote 1 in 1925.

(c) Maximum for the year.

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EXPENDITURE FOR NAVAL PURPOSES OF THE PRINCIPAL FOREIGN POWERS.

UNITED STATES NAVY.

APPROPRIATION BILL, 1929 (July 1, 1928, to June 30, 1929).

Appropriation Title.	Appropriations. 1928. Dollars.	1929. Dollars.
Salaries, office of the Secretary of the Navy	169,880	172,880
Salaries, General Board	10,550	10,740
Salaries, Naval Examining Board	9,420	9,420
Salaries, Compensation Board	18,400	15,400
Contingent expenses, Navy Department	80,000	81,500
Printing and binding	500,000	510,000
Pay, Miscellaneous	1,520,000	1,510,000
Contingent, Navy	40,000	30,000
Temporary government, West Indian Islands	280,000	300,000
State Marine Schools	75,000	75,000
Care of lepers, Guam	30,000	35,000
Naval Research Laboratory	175,000	200,000
Salaries, office Naval Records and Library	37,940	37,940
Salaries, office of Judge Advocate General	107,000	110,860
Salaries, office of Chief of Naval Operations	66,640	66,640
Salaries, Board of Inspection and Survey	19,560	19,500
Salaries, Naval Communications	126,200	126,000
Salaries, Office of Naval Intelligence	37,800	37,800
Recreation for enlisted men	400,000	400,000
Contingent, navigation	14,000	10,000
Gunnery and engineering exercises	46,650	60,000
Instruments and supplies	585,000	580,000
Ocean and lake surveys	85,000	80,000
Naval training station, California	160,000	170,000
Naval training station, Rhode Island	245,000	245,000
Naval training station, Great Lakes	245,000	270,000
Naval training station, Hampton Roads	245,000	245,000
Naval Reserve	3,890,500	4,145,000
Naval Reserve Officers' Training Corps	65,000	100,000
Naval War College	105,000	110,000
Salaries, Bureau of Navigation	414,540	414,540
Salaries, Hydrographic Office	325,000	335,000
Contingent and miscellaneous expenses, Hydrographic Office	114,800	116,360
Salaries, Naval Observatory	88,600	106,060
Contingent and miscellaneous expenses, Naval Observatory	29,420	28,760
Grounds and roads	6,000	6,000
Salaries, Nautical Almanac Office	32,060	32,500
Engineering	19,050,000	19,400,000
Engineering Experimental Station, Annapolis	175,000	175,000
Salaries, Bureau of Engineering	275,480	275,480
Construction and repair of vessels	16,600,000	17,000,000
Salaries, Bureau of Construction and Repair	349,830	349,830
Ordnance and ordnance stores	11,450,000	12,000,000
Purchase and manufacturing of smokeless powder	1,000,000	1,000,000
Torpedoes and appliances	450,000	450,000
Experiments, Bureau of Ordnance	190,000	Merged with O. & O.S.

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UNITED STATES NAVY—*continued.*

Appropriation Title.	Appropriations. 1928. Dollars.	1929. Dollars.
Salaries, Bureau of Ordnance	144,000	144,000
Pay, Subsistence and transportation	148,092,927	149,250,000
Maintenance, supplies and accounts	9,778,000	9,862,000
Fuel and transportation	12,000,000	10,690,000
Salaries, Bureau of Supplies and Accounts	793,800	793,800
Medical Department	2,012,000	2,030,000
Care of the dead	75,000	60,000
Salaries, Bureau of Medicine and Surgery	71,960	72,360
Maintenance, Yards and Docks	7,000,000	7,500,000
Contingent, Yards and Docks	125,000	125,000
Salaries, Bureau of Yards and Docks	258,000	258,000
Public works	4,740,500	4,726,000
Aviation, Navy	20,100,000	32,735,000
Salaries, Bureau of Aeronautics	200,000	204,800
Pay, Naval Academy	804,000	812,000
Current and miscellaneous expenses, Naval Academy	85,000	85,000
Maintenance and repairs, Naval Academy	1,000,000	1,075,000
Pay, Marine Corps	15,484,000	15,750,000
Pay, civil employees, Marine Corps	158,300	158,300
General expenses, Marine Corps	8,269,000	8,370,000
Alteration to naval vessels	2,210,000	—
Increase of the Navy—C. and M.	19,315,000	31,500,000
Increase of the Navy, A. A. and A.	9,500,000	16,500,000
Modernization of vessels	—	6,575,000
Total Annual appropriations	322,157,107	360,279,470
Total Permanent and indefinite	1,916,850	1,887,550
Total	324,073,957*	362,167,020*

* The par rate of exchange is $4·866 to the £.

IMPERIAL JAPANESE NAVY.

ESTIMATES, 1928–29 (1st April, 1928, to 31st May, 1929).

The Estimates of the Imperial Japanese Navy are divided under two headings "Ordinary" and "Extraordinary."

The figures for 1928–29 as compared with the previous year are as follows:—

	1928–29. Yen.	1927–28. Yen.
Ordinary	143,472,737	135,978,084
Extraordinary	118,972,006	120,428,691
Total	264,444,743†	256,406,775†

The "Ordinary" expenditure is for pay, provisions, etc., and the general upkeep of the Fleet and its Air Service, and the "Extraordinary" expenditure for new construction and additions and improvements to the present Fleet and its Air Service and establishments.

† The par rate of exchange is 9·75 yen to the £.

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FRENCH NAVY.

ESTIMATES, 1928–29.

The Estimates of the French Navy are shown divided under three headings, "Ordinary," "Extraordinary," and "Temporary expenses for reparations due to war."

The figures for 1928-29, including the votes for new construction, as compared with the previous year, are as follows :—

	1928–29. Francs.	1927–28. Francs.
Ordinary	—	1,832,571,819
Extraordinary	—	5,202,000
Temporary expenses for reparations due to war	—	5,000
Total	2,565,720,593*	1,837,778,819

* The par rate of exchange is 25·225 frs. to the £.

ROYAL ITALIAN NAVY.

ESTIMATES, 1928–29.

(July 1, 1928—June 30, 1929.)

ORDINARY EXPENDITURE.

	1928–29. Lire.	1927–28. Lire.
General Expenses	4,558,000	4,870,000
Pensions	83,070,000	83,070,000
Education	3,710,000	4,120,000
Lighthouses and Pilotage	6,095,000	6,275,000
Maintenance, Construction, Armaments, Establishments, and Coast Works	814,549,000	862,658,000
Total	911,982,000	960,998,000

EXTRAORDINARY EXPENDITURE.

General expenses of the Navy and Various	239,809,030	257,977,630
Total	1,151,782,030	1,218,970,630

* The par rate of exchange is 25·225 lire to the £.

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BRITISH AND FOREIGN NAVIES.

PRINCIPAL OFFICIALS.

Great Britain.

First Lord.—The Right Hon. William C. Bridgeman, M.P.

First Sea Lord and Chief of Naval Staff.—Admiral of the Fleet Sir Charles E. Madden, Bt., G.C.B., G.C.V.O., K.C.M.G., D.C.L. (Oxon.), LL.D.

Second Sea Lord and Chief of Naval Personnel.—Vice-Admiral Sir Michael H. Hodges, K.C.B., C.M.G., M.V.O.

Third Sea Lord and Controller.—Rear-Admiral Roger R. C. Backhouse, C.B., C.M.G.

Fourth Sea Lord and Chief of Supplies and Transport.—Vice-Admiral Vernon H. S. Haggard, C.B., C.M.G.

Deputy Chief of Naval Staff.—Vice-Admiral William W. Fisher, C.B., C.V.O.

Assistant Chief of Naval Staff.—Rear-Admiral Alfred D. P. R. Pound, C.B.

Civil Lord.—The Right Hon. Earl Stanhope, D.S.O., M.C.

Parliamentary and Financial Secretary.—Cuthbert M. Headlam, Esq., D.S.O., O.B.E., M.P.

Permanent Secretary.—Sir Oswyn A. R. Murray, K.C.B.

Foreign Powers.

Country.	Minister of Marine.	Chief of Staff.
Argentina . .	Admiral Don Manuel Domecq Garcia	Rear-Admiral Abel Renard.
Brazil . . .	Rear-Admiral A. S. Pinto da Luz	Vice-Admiral José Maria Penido
Chile	Commander Carlos Frodden	Rear-Admiral Alejandro Garcia
China . . .	Admiral T. S. Wen	
Denmark . .	S. Brorsen	Rear-Admiral H. Rechnitzer
France . . .	Georges Leygues	Vice-Admiral L. H. Violette
Germany . .	General W. Groener	Vice-Admiral D. Raeder
Greece . . .	M. Agryropoulos	Rear-Admiral C. Malikopoulos
Italy	Signor Mussolini	Rear-Admiral E. Burzagli, C.B.
Japan	Admiral K. Okada	Admiral K. Suzuki
Netherlands . .	J. M. J. H. Lambooy	Rear-Admiral J. C. Jager
Norway . . .	M. A. Ryst	Commodore P. Rolfsen
Peru	Nunez Chavez	Rear-Admiral A. G. Howe (Captain, U.S.N.)
Poland . . .	Marshal Pilsudski	Captain J. Swirski
Portugal . . .	Captain Guimaraes	Rear-Admiral M. E. Correia
Soviet Union .	N. E. Voroshilov (President, Committee of Defence)	
Spain	Vice-Admiral Don H. Cornejo y Carvajal	Vice-Admiral Don N. Pita y Estrada
United States .	C. D. Wilbur	Admiral C. F. Hughes

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BRITISH AND FOREIGN NAVAL ATTACHÉS.

BRITISH NAVAL ATTACHÉS ACCREDITED TO FOREIGN COUNTRIES.

To:—

Albania, Bulgaria, Greece, Italy, Jugoslavia, Roumania, and Turkey: Naval Attaché, Captain C. D. Burke (appointed 15th February, 1926); Headquarters, Rome, Italy.

Belgium, France, Netherlands, Portugal and Spain: Naval Attaché, Captain J. M. Pipon, C.M.G., M.V.O., O.B.E. (appointed 15th July, 1925); Headquarters, Paris, France.

Denmark, Esthonia, Finland, Germany, Latvia, Lithuania, Norway, Poland and Sweden: Naval Attaché, Commander G. S. F. Nash (appointed 15th February, 1926); Headquarters, Berlin, Germany.

Japan and China: Naval Attaché, Captain C. V. Robinson (appointed 31st December, 1926); Assistant Naval Attaché Engineer Commander E. J. Allen (appointed 4th June, 1927): Headquarters, Tokyo, Japan.

North and Central America, including Costa Rica, Cuba, Haiti, Honduras, Mexico, Nicaragua, Panama, Salvador, San Domingo, and the United States: Naval Attaché, Captain J. S. M. Ritchie (appointed 7th March, 1928); Assistant Naval Attaché, Engineer-Captain A. Knothe (appointed 6th June, 1928): Headquarters, Washington, U.S.A.

South America, including the Argentine Republic, Brazil, Chile, Columbia, Ecuador, Paraguay, Peru, Uruguay, and Venezuela: Naval Attaché, Captain St. A. B. Wake (appointed 12th August, 1927).

FOREIGN NAVAL ATTACHÉS ACCREDITED TO GREAT BRITAIN.

From:—

Argentine Republic: Naval Attaché, Commander Don Guillermo Ceppi: 30, Grosvenor Gardens, S.W.1.

Brazil: Naval Attaché, Commander José Maria Reiva, 19, Upper Brook Street, W.1.

Chile: Naval Attaché, Captain Don Edgardo von Schroeders: Address, Chilean Legation, 3, Green Street, W.1.

Denmark: Naval Attaché (Post vacant): Address, 29, Pont Street, London, S.W.1.

France: Naval Attaché, Capitaine de Vaisseau Thouroude, C.V.O., D.S.O.; Assistant N.A., Ingénieur du Génie Maritime M. F. P. M. Salmon-Legagneur: Address, Albert Gate House, Hyde Park, London, S.W.1.

Greece: Naval and Air Attaché, Captain D. Papalexopoulos, C.M.G.: Address, Flat B, Upper Feilde, Park St., London, W.1.

Italy: Naval Attaché, Captain di Vascello Ferdinando Farina: Address, 11, Queen's Gate Gardens, Kensington, S.W.7.

Japan: Naval Attaché, Commander Prince Shimazu; Assistant Naval Attaché, Lieutenant Commander Kondo: Address, Broadway Court, Westminster, London, S.W.1.

Norway: Naval Attaché, Commander H. F. Dons: Address, Offices of the Norway Legation, 21–24, Cockspur Street, Westminster, London, S.W.1.

Peru: Naval Attaché, Commander Don Carlos Fajardo: Address, Peruvian Legation, 28, Holland Park, London, W.11.

Spain: Naval Attaché, Capitan de Corbeta Don Juan Pastor y Tomasety: Address, Spanish Embassy, 1, Grosvenor Gardens, Westminster, London, S.W.1.

Sweden: Naval Attaché, Commander Baron Lave Malcolm Beck-Friis: Address, Swedish Legation, 27, Portland Place, London, W.1.

United States of America: Naval Attaché, Captain W. W. Galbraith; Assistant Naval Attachés, Commander J. R. Beardall, Commander J. O. Gawne (C.C.), Lieutenant Commander Howard E. Kingman, Lieutenant Commander W. D. Thomas (Aviation): Address, 4, Grosvenor Gardens, Westminster, London, S.W.1.

Uruguay: Naval Attaché, Captain Rivera Travieso: Address, 8 Elvaston Place, South Kensington, S.W.7.

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MERCHANT SHIPPING REFERENCE SECTION.

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BRITISH AND IRISH MERCHANT TONNAGE, AND UNITED STATES SEA-GOING MERCHANT TONNAGE, AS COMPARED WITH THE WORLD'S TOTAL MERCHANT FLEET.

Year.	World.	Great Britain and Ireland.	Percentage of British and Irish Tonnage to Total.	United States.†	Percentage of United States Tonnage to Total.
	Tonnage.	Tonnage.		Tonnage.	
1890	21,118,528	10,241,856	48·5	‡	
1891	22,912,753	10,585,747	46·2	‡	
1892	23,672,698	11,157,662	47·1	1,926,426	8·1
1893	24,236,865	11,563,997	47·7	1,964,359	8·1
1894	24,547,597	11,807,010	48·1	2,171,459	8·8
1895	25,086,199	12,117,957	48·3	2,164,753	8·6
1896	25,593,186	12,293,539	48·0	2,234,725	8·7
1897	25,889,044	12,403,409	47·9	2,326,888	9·0
1898	26,543,360	12,587,904	47·4	2,448,677	9·2
1899	27,613,851	12,926,924	46·8	1,872,245	6·8
1900	28,957,358	13,241,446	45·7	2,035,062	7·0
1901	30,479,971	13,656,161	44·8	2,231,925	7·3
1902	32,302,412	14,431,072	44·7	2,342,913	7·3
1903	33,501,855	14,889,571	44·4	2,480,981	7·4
1904	34,786,132	15,391,350	44·2	2,590,349	7·4
1905	35,998,180	15,803,180	43·9	2,649,411	7·4
1906	37,550,477	16,381,350	43·6	2,672,042	7·1
1907	39,435,788	16,999,668	43·1	2,728,711	6·9
1908	40,920,551	17,318,351	42·3	2,802,387	6·8
1909	41,447,825	17,377,936	41·9	2,791,282	6·7
1910	41,912,520	17,516,479	41·8	2,761,605	6·6
1911	43,144,909	17,872,697	41·4	2,808,684	6·5
1912	44,600,677	18,213,620	40·8	2,848,829	6·4
1913	46,970,113	18,696,237	39·8	2,998,457	6·4
1914	49,089,552	19,256,766	39·2	2,970,284	6·0
1915	49,261,769	19,541,368	39·7	3,522,933	7·1
1916	48,683,136	19,134,857	39·3	3,790,578	7·8
1917*	—	—	—	—	—
1918*	—	—	—	—	—
1919	50,919,273	16,555,471	32·5	10,782,170	21·2
1920	57,314,065	18,330,424	32·0	13,789,874	24·0
1921	61,974,653	19,571,554	31·6	14,697,088	23·7
1922	64,370,786	19,295,637	30·0	14,738,506	22·9
1923	65,166,238	19,281,549	29·6	14,597,035	22·4
1924	64,023,567	19,105,838	29·8	13,530,544	21·1
1925	64,641,418	19,440,711	30·1	12,948,632	20·0
1926	64,784,370	19,399,797	29·9	12,364,668	19·1
1927	65,192,910	19,309,022	29·6	12,070,050	18·5
1928	66,954,659	19,875,350	29·6	11,997,441	17·9

* Figures for 1917 and 1918 not available.
† Excluding American Great Lakes vessels.
‡ Not available.
NOTE.—Prior to 1919 the tonnages shown are the totals of gross tonnage for steam and motor vessels, and *net* tonnage for sailing vessels; in 1919 and subsequent years the figures are given in gross tonnage throughout.

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NUMBER AND GROSS TONNAGE OF THE VESSELS OF 100 TONS TO EACH OF THE SEVERAL COUNTRIES OF THE WORLD, AS

Flag.	June, 1913.†		June, 1919.		June, 1922.	
	No.	Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	9,214	18,696,237	7,964	16,555,471	8,849	19,295,637
British Dominions	2,073	1,735,306	2,141	2,052,404	2,472	2,746,883
Total	11,287	20,431,543	10,105	18,607,875	11,321	22,042,520
United States of America — Sea	2,696	2,998,457	4,350	10,782,170	4,886	14,738,506
United States of America — Lakes	627	2,382,690	506	2,257,786	495	2,247,690
United States of America — Philippine Islands	77	46,489	73	51,817	99	76,264
United States of America — Total	3,400	5,427,636	4,929	13,091,773	5,480	17,062,460
Argentine	308	214,835	215	154,441	216	181,555
Austria-Hungary	427	1,011,414	339	714,617	—	—
Belgium	172	304,386	152	313,276	275	579,477
Brazil	459	329,637	428	512,675	399	492,571
Chili	131	139,792	114	101,647	126	131,401
China	66	86,690	102	132,515	134	188,388
Cuba	59	61,536	51	47,295	65	62,677
Denmark	811	762,054	645	702,436	822	1,038,138
Esthonia	—	—	—	—	98	45,259
Finland	—	—	338	180,962	352	213,671
France	1,552	2,201,164	1,440	2,233,631	2,094	3,845,792
Germany	2,321	5,082,061	1,768	3,503,380	1,723	1,887,408
Greece	442	722,782	312	323,796	379	668,127
Holland	759	1,309,849	931	1,591,911	1,164	2,632,713
Italy	1,114	1,521,942	858	1,370,097	1,413	2,866,335
Japan *	1,037	1,500,014	1,418	2,325,266	2,026	3,586,918
Jugo-Slavia	—	—	‡	‡	‡	‡
Latvia	—	—	—	—	67	40,124
Norway	2,191	2,457,890	1,629	1,857,829	1,852	2,600,861
Peru	60	45,514	63	79,342	74	101,209
Portugal	208	120,579	227	261,212	286	285,878
Roumania	33	45,408	35	63,792	31	72,297
Russia	1,216	974,178	618	541,005	—	—
Spain	607	840,995	576	750,611	973	1,282,757
Sweden	1,436	1,047,270	1,263	992,611	1,345	1,115,375
Turkey	272	157,298	161	116,249	—	—
Other Countries and flag not recorded	158	98,115	495	304,530	1,167	1,270,564
Total	30,591	46,970,113	29,255	50,919,273	33,935	64,370,786

* Japanese sailing vessels are not recorded in Lloyd's Register Book.

† In 1913 the figure shown is the total of the gross tonnage of steam and motor vessels, and the *net* tonnage of sailing vessels; in 1919 and subsequent years the figure is given in gross tons throughout.

‡ Figures included in total for "Other countries."

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GROSS AND UPWARDS (STEAM, SAIL, AND MOTOR) BELONGING RECORDED IN LLOYD'S REGISTER.

June, 1924.		June, 1926.		June, 1927.		June, 1928.	
No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
8,559	19,105,838	8,369	19,399,797	8,216	19,309,022	8,204	19,875,350
2,449	2,772,662	2,477	2,870,327	2,439	2,865,055	2,479	2,907,223
11,008	21,878,500	10,864	22,270,124	10,655	22,174,077	10,683	22,782,573
4,508	13,530,544	4,001	12,364,668	3,843	12,070,050	3,759	11,997,441
524	2,361,464	529	2,433,049	563	2,515,250	577	2,540,517
96	64,959	97	81,044	97	84,972	99	95,444
5,128	15,956,967	4,627	14,878,761	4,503	14,670,272	4,435	14,633,402
215	199,185	242	234,848	267	262,307	292	287,614
—	—	—	—	—	—	—	—
251	560,597	225	507,473	224	499,229	233	492,609
375	464,734	351	482,308	376	525,431	388	559,468
147	181,092	138	179,712	128	162,378	130	170,864
168	248,108	201	299,806	219	327,689	218	317,279
70	59,528	72	61,735	68	52,383	70	52,579
764	1,035,943	771	1,081,146	748	1,059,846	713	1,067,539
108	45,897	115	49,025	100	44,662	107	52,630
322	207,952	363	232,792	342	241,355	354	280,581
1,857	3,498,233	1,769	3,490,606	1,752	3,469,980	1,682	3,344,465
2,003	2,953.671	1,986	3,110,918	1,990	3,363,046	2,080	3,777,251
409	761,210	467	924,944	484	1,028,813	515	1,187,508
1,082	2,556,417	1,109	2,564,904	1,156	2,654,008	1,290	2,816,705
1,299	2,832,212	1,401	3,240,630	1,429	3,483,383	1,429	3,428,817
2,055	3,842,707	2,087	3,967,617	2,035	4,033,304	2,049	4,139,815
‡	‡	137	195,787	144	245,698	145	260,912
69	46,281	87	67,783	88	88,782	98	116,754
1,758	2,505,393	1,844	2,841,905	1,805	2,824,225	1,787	2,968,207
38	70,821	46	79,068	43	75,814	42	69,100
279	301,308	285	280,116	282	258,448	270	246,126
39	71,183	37	68,173	31	65,570	34	71,503
397	338,792	370	323,284	346	308,882	354	376,819
950	1,239,521	924	1,163,008	885	1,161,369	884	1,164,272
1,405	1,254,550	1,380	1,338,089	1,371	1,365,390	1,383	1,447,470
184	105,148	174	136,796	180	150,928	179	159,836
563	727,702	468	637,799	435	440,718	432	554,393
32,956	64,023,567	32,615	64,784,370	32,175	65,192,910	32,408	66,954,659

* Japanese sailing vessels are not recorded in Lloyd's Register Book.
‡ Figures included in total for "Other Countries."

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NUMBERS OF STEAMERS AND MOTOR VESSELS OWNED BY THE PRINCIPAL MARITIME COUNTRIES ON JUNE 30, 1928, BY DIVISIONS OF AGE.

Country.	Numbers of Vessels owned of Various Ages.						Total Number of Vessels owned.	Percentage of Total Number of Ships under 5 years old.
	Under 5 years.	5 years and under 10 years.	10 years and under 15 years.	15 years and under 20 years.	20 years and under 25 years.	25 years and over.		
Gt. Brit. & Ireland	1,242	1,470	1,439	1,103	926	1,630	7,810	15·9
British Dominions	280	350	261	335	256	548	2,030	13·8
United States * .	101	1,442	583	235	196	448	3,005	3·4
Denmark . . .	90	175	88	46	76	152	627	14·3
France	83	384	236	225	219	335	1,482	6·1
Germany . . .	289	613	244	239	255	413	2,053	14·1
Holland . . .	218	290	297	160	109	196	1,270	17·2
Italy	111	183	129	123	146	450	1,142	9·7
Japan	154	515	570	160	205	444	2,048	7·5
Norway . . .	229	388	319	215	217	397	1,765	13·0
Spain	36	178	114	48	53	360	789	4·6
Sweden . . .	64	173	156	95	146	605	1,239	5·1
Other Countries .	230	377	383	463	527	1,598	3,578	6·4
World Total* .	3,159	6,585	4,862	3,524	3,486	7,771	29,387	10·7

* Excluding American Great Lakes vessels.

NUMBERS OF STEAMERS AND MOTOR VESSELS OWNED BY THE PRINCIPAL MARITIME COUNTRIES ON JUNE 30, 1928, BY DIVISIONS OF GROSS TONNAGE.

Country.	Numbers of Vessels Owned of Various Gross Tonnages.										Total Number of Vessels owned.	Percentage of Total Number of Vessels of 6000 gross tons and over.
	100 tons and under 500 tons.	500 tons and under 1000 tons.	1000 tons and under 2000 tons.	2000 tons and under 4000 tons.	4000 tons and under 6000 tons.	6000 tons and under 8000 tons.	8000 tons and under 10,000 tons.	10,000 tons and under 15,000 tons.	15,000 tons and under 20,000 tons.	20,000 tons and over.		
Gt. Brit. & Ireland	3,846	690	766	833	1,225	546	182	146	49	27	7,810	12·2
British Dominions	988	295	306	259	119	43	9	7	4	—	2,030	3·1
United States * .	632	176	195	622	740	497	90	42	7	4	3,005	21·3
Denmark . . .	172	91	210	96	30	15	11	2	—	—	627	4·5
France	646	114	167	245	179	57	45	22	4	3	1,482	8·8
Germany . . .	931	329	263	204	149	102	49	15	4	7	2,053	8·6
Holland . . .	596	56	163	186	106	105	36	16	4	2	1,270	12·8
Italy	334	103	112	226	219	106	26	6	2	8	1,142	12·9
Japan	778	237	260	386	255	99	22	11	—	—	2,048	6·5
Norway . . .	672	211	429	197	175	61	17	3	—	—	1,765	4·6
Spain	375	84	97	173	46	7	3	4	—	—	789	1·8
Sweden . . .	592	164	310	99	57	10	1	2	4	—	1,239	1·4
Other Countries .	1,581	475	579	592	274	48	26	3	—	—	3,578	2·2
World Total * . .	11,668	3,044	3,910	4,249	3,715	1,843	549	280	78	51	29,387	9·5

* Excluding American Great Lakes vessels.

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LARGEST MERCHANT VESSELS OF THE WORLD.

A list of all vessels of 10,000 tons gross or more arranged in order of gross tonnage.

(T.= turbine engines ; M.= motor engines ; T. & R.= turbines & reciprocating engines ; T.E.= turbo-electric.)

Gross tonnage.	Name.	Speed † (knots.)	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
59,957	Leviathan (T.)	24	1914	U.S.	U.S.S.B.	907·6	100·3	58·2
56,621	Majestic (T.)	25	1921	Br.	Oceanic S.N. Co.	915·5	100·1	58·2
52,226	Berengaria (T.)	23	1912	Br.	Cunard S.S. Co.	883·6	98·3	57·1
46,439	Olympic (T. & R.).	22	1911	Br.	Oceanic S.N. Co.	852·5	92·5	59·5
45,647	Aquitania (T.)	23	1914	Br.	Cunard S.S. Co.	868·7	97·0	49·7
43,548	Ile de France (T.)	23¼	1926	Fr.	Cie. Gén. Transatlantique	757·8	91·8	61·2
34,569	Paris (T.)	22	1921	Fr.	Cie. Gén. Transatlantique	735·4	85·3	59·1
34,351	Homeric	20	1922	Br.	Oceanic S.N. Co.	751·0	83·3	48·6
32,650	Augustus (M.)	20	1927	Ital.	Nav. Gen. Italiana	666·3	82·8	47·2
32,583	Roma (T.)	21	1926	Ital.	Nav. Gen. Italiana	664·7	82·6	51·5
32,354	Columbus	20	1922	Ger.	Norddeutscher Lloyd	749·6	83·1	49·4
30,696	Mauretania (T.)	25	1907	Br.	Cunard S.S. Co.	762·2	88·0	57·1
28,150	Statendam (T.)	?	1926	Holl.	Holland-Amerika Lijn	670·4	81·4	49·4
27,561	Cap Arcona (T.)	20	1927	Ger.	Hamburg Sud-Amerika	643·6	84·6	41·9
27,132	Belgenland (T. & R.)	17½	1917	Br.	International Nav. Co.	670·4	78·4	44·7
25,661	Conte Grande (T.)	—	1928	Ital.	Lloyd Sabaudo	652·2	78·3	27·2
25,160	Empress of Scotland	17½	1905	Br.	Canadian Pacific Co.	677·5	77·3	50·2
25,000	Vulcania (M.)	19	1927	Ital.	Cosulich Soc. Tri. di Nav.	599·0	79·5	46·5
24,563	Adriatic.	18	1906	Br.	Oceanic S.N. Co.	709·2	75·5	52·6
24,416	Conte Blancamano (T.)	21	1925	Ital.	Lloyd Sabaudo	650·9	76·1	27·5
24,281	Duilio (T.)	21	1923	Ital.	Nav. Gen. Italiana	602·4	76·3	46·3
24,149	Rotterdam	17	1908	Holl.	Nederl-Amerikaansche S.M.	650·5	77·4	43·5
23,940	Saturnia (M.)	19	1927	Ital.	"Cosulich" Soc.	606·2	79·8	46·5
23,884	Baltic	17	1904	Br.	Oceanic S.N. Co.	709·2	75·6	52·6
23,788	George Washington	18	1908	U.S.	U.S.S.B.	699·1	78·2	50·1
23,769	France (T.)	24	1912	Fr.	Cie. Gén. Transatlantique	690·1	75·6	48·5
22,181	Alcantara (M.)	17½	1926	Br.	Royal Mail Co.	630·5	78·5	40·5
22,071	Asturias (M.)	17½	1925	Br.	R.M.S.P. Meat Transports	630·5	78·5	40·5
21,998	Minnetonka (T.)	16½	1924	Br.	Atlantic Transport Co.	600·8	80·4	49·4
21,861	Empress of Australia (T.)	17	1914	Br.	Canadian Pacific Co.	589·9	75·2	41·5
21,716	Minnewaska (T.)	16½	1923	Br.	Atlantic Transport Co.	600·8	80·4	49·4
21,657	Giulio Cesare (T.)	20	1921	Ital.	Nav. Gen. Italiana	602·4	76·5	46·3
21,517	Empress of Canada (T.)	20	1922	Br.	Canadian Pacific Co.	627·0	77·9	42·2
21,500	Duchess of Athol (T.)	—	1928	Br.	Canadian Pacific Rly.	580·0	75·3	41·8
21,500	Duchess of Bedford (T.)	—	1928	Br.	Canadian Pacific Rly.	581·9	75·2	41·8
21,455	New York (T.)	16½	1927	Ger.	Hamburg Amerika Linie	602·5	79·0	42·1
21,227	Cedric	17	1903	Br.	Oceanic S.N. Co.	680·9	75·3	44·1
21,179	Celtic	17	1901	Br.	Oceanic S.N. Co.	680·9	75·3	44·1
21,144	America	16	1905	U.S.	U.S.S.B.	668·8	74·3	47·8
21,000	Hamburg (T.)	16½	1925	Ger.	Hamburg-Amerika Linie	602·5	78·7	51·6
20,847	Mooltan.	17	1923	Br.	P. & O. S.N. Co.	600·8	73·4	48·6
20,837	Maloja	17	1923	Br.	P. & O. S.N. Co.	600·8	73·4	48·6
20,815	Albert Ballin (T.)	16	1923	Ger.	Hamburg-American Line	602·4	78·7	41·9
20,602	Deutschland (T.)	16	1923	Ger.	Hamburg-American Line	602·5	78·7	51·6
20,576	Cap Polonio (T. & R.)	18	1914	Ger.	Hamburg-Sud-Amer. Ges.	637·8	72·4	39·6
20,325	California (T.E.)	18	1928	U.S.	International Mercantile Marine	574	80	52·0
20,277	Carinthia (T.)	16½	1925	Br.	Cunard Co.	600·7	73·8	40·7
20,175	Franconia (T.)	16½	1923	Br.	Cunard Co.	601·3	73·7	40·6
20,063	Carnarvon Castle (M.)	18	1926	Br.	Union Castle Co.	630·7	73·5	41·5
20,032	Otranto (T.)	20	1925	Br.	Orient S.N. Co.	632·0	75·2	32·9
20,001	Oronsay (T.)	20	1925	Br.	Orient S.N. Co.	633·6	75·2	33·0
19,941	Orford (T.)	20	1927	Br.	Orient Line	632·2	75·4	33·1
19,782	Caronia	18½	1905	Br.	Cunard Co.	650·0	72·2	40·2
19,777	Orama (T.)	20	1924	Br.	Orient S.N. Co.	632·0	75·2	32·9
19,761	Scythia (T.)	16½	1920	Br.	Cunard Co.	600·7	73·8	40·7
19,695	Laconia (T.)	16½	1922	Br.	Cunard Co.	601·3	73·7	40·6
19,692	Resolute (T. R.).	16½	1920	Ger.	Hamburg Amerika Linie	590·4	72·2	40·2
19,597	Samaria (T.)	16½	1921	Br.	Cunard Co.	601·5	73·7	40·7
19,566	Carmania (T.)	18½	1905	Br.	Cunard Co.	650·4	72·2	40·0
19,527	Reliance (T. & R.)	16½	1920	Ger.	Hamburg Amerika Linie	590·4	72·3	39·7
19,361	Agamemnon	20	1902	U.S.	U.S.S.B.	684·3	72·3	40·2
19,300	Viceroy of India (T.E.)	—	1928	Br.	P. & O. Line	582·7	76·0	45·5

* The registered dimensions are measured as follows : Length from fore part of stem at extreme top to aft side of head of stern post, or centre of rudder stock if a balanced rudder is fitted ; Breadth is taken to outside of plating; Depth from top of beam at centre line of tonnage deck amidships to ceiling. If there is no ceiling it is measured to the tank top. If there are more than two decks, the tonnage deck is the second deck, counting from below.

† The speeds shown in this Table are as given by the owners.

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LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
19,086	Bermuda	18	1927	U.S.	Bermuda & West Indies S.S. Co.	525·9	74·1	39·6
19,023	Arundel Castle (T.)	18	1921	Br.	Union Castle Co.	630·5	72·5	41·5
18,967	Windsor Castle (T.)	18	1922	Br.	Union Castle Co.	632·4	72·5	41·6
18,940	Albertic	18	1923	Br.	White Star Line	590·8	72·0	37·6
18,765	Conte Verde (T.)	20	1923	Ital.	Lloyd Sabaudo	570·2	74·2	35·9
18,724	Laurentic (T. & R.)	17	1927	Br.	Oceanic Steam Nav. Co.	578·2	75·4	40·6
18,565	Lapland	17	1908	Br.	International Nav. Co.	605·8	70·4	37·4
18,495	Ceramic (T. & R.)	16	1913	Br.	Oceanic S.N. Co.	655·1	69·4	43·8
18,372	Mount Vernon	20	1906	U.S.	U.S.S.B.	685·4	72·2	40·5
18,357	Empress of France (T.)	19	1913	Br.	Allan Line	571·4	72·4	41·7
17,910	Republic	14	1907	U.S.	U.S.S.B.	599·0	68·2	48·3
17,759	De Grasse (T.)	17½	1924	Fr.	Cie. Gén. Transatlantique	552·1	71·4	42·3
17,716	Gripsholm (M.)	17	1925	Swe.	Svenska Amerika Linie	553·0	74·4	37·7
17,491	Aorangi (M.)	18½	1924	Br.	Union S.S. Co. of N.Z.	580·1	72·2	43·4
17,282	Montnairn	16½	1908	Br.	Canadian Pacific Co.	590·1	68·3	38·6
17,281	Minnekahda (T. & R.)	16	1917	U.S.	Atlantic Transport Co.	620·5	66·4	47·3
17,200	Malolo (T.)	?	1926	U.S.	American-Hawaiian S.S. Co.	554·0	83·0	54·0
17,149	Nieuw Amsterdam	16	1906	Holl.	Nederl. Amerikaansche S.M.	600·3	68·9	35·6
17,048	Conte Rosso (T.)	20	1922	Ital.	Lloyd Sabaudo	570·2	74·2	35·9
17,046	Caledonia (T.)	16½	1925	Br.	Anchor Line	553·0	70·4	38·7
16,991	Tuscania (T.)	16½	1922	Br.	Anchor Line	552·3	70·3	38·6
16,971	Cleveland	15½	1908	Ger.	Hamburg Amerika Linie	588·9	65·3	46·7
16,923	Transylvania (T.)	16½	1925	Br.	Anchor Line	552·4	70·3	30·3
16,909	Empress of Asia (T.)	20	1913	Br.	Canadian Pacific Co.	570·1	68·2	42·0
16,810	Empress of Russia (T.)	20	1913	Br.	Canadian Pacific Co.	570·2	68·2	42·0
16,792	California (T.)	16½	1923	Br.	Anchor Line	553·0	70·4	38·8
16,786	Arabic	17	1908	Br.	Oceanic S.N. Co.	590·2	69·7	38·9
16,650	Ranchi	17½	1925	Br.	P. & O. S.N. Co.	548·5	71·3	43·2
16,619	Rawalpindi	17½	1925	Br.	P. & O. S.N. Co.	547·7	71·3	43·4
16,601	Ranpura	17½	1925	Br.	P. & O. S.N. Co.	548·3	71·3	43·2
16,568	Rajputana	17½	1926	Br.	P. & O. S. N. Co.	547·7	71·3	43·4
16,504	Mongolia (T.)	16	1923	Br.	P. & O. S. W. Co.	551·6	72·0	38·5
16,500	Regina (T. & R.)	16	1918	Br.	F. Leyland & Co.	575·3	67·8	41·2
16,484	Doric (T.)	16	1923	Br.	Oceanic S. N. Co.	575·5	67·9	41·2
16,449	Moldavia (T.)	16	1922	Br.	P. & O. S. N. Co.	552·4	71·7	38·4
16,418	Montcalm (T.)	17	1921	Br.	Canadian Pacific Co.	549·5	70·2	40·2
16,402	Montrose (T.)	17	1922	Br.	Canadian Pacific Co.	548·7	70·2	40·3
16,365	Cameronia (T.)	16½	1920	Br.	Anchor Line	552·4	70·4	38·8
16,322	Pennland (T. & R.)	16	1922	Br.	International Nav. Co.	575·4	67·8	41·2
16,314	Montclare (T.)	17	1922	Br.	Canadian Pacific Co.	549·5	70·2	40·2
16,302	Narkunda	18½	1920	Br.	P. & O. S. N. Co.	581·4	69·4	27·7
16,243	Lancastria (T.)	16½	1922	Br.	Cunard Co.	552·8	70·4	38·8
16,088	Naldera	18½	1918	Br.	P. & O. S. N. Co.	580·9	67·2	44·4
16,063	Calgaric (T. & R.)	15	1918	Br.	White Star Line	550·3	67·3	43·0
15,673	Christiaan Huygens (M.)	17	1927	Hol.	Stoomr. "Nederland"	551·5	68·8	36·2
15,646	Montroyal	18	1906	Br.	Canadian Pacific Co.	548·8	65·7	36·7
15,620	Andes (T. & R.)	17	1913	Br.	Royal Mail Co.	570·3	67·3	33·3
15,551	Almanzora (T. & R.)	17	1914	Br.	Royal Mail Co.	570·0	67·3	33·3
15,499	Orduña (T. & R.)	15	1914	Br.	Royal Mail Co.	550·3	67·3	43·0
15,486	Orbita (T. & R.)	15	1915	Br.	Royal Mail Co.	550·3	67·3	43·0
15,450	Veendam (T.)	15	1923	Holl.	Holland-Amerika Lijn	550·2	67·3	41·1
15,445	Manchuria	16	1904	U.S.	Atlantic Transport Co.	600·0	65·3	31·1
15,442	Mongolia	16	1904	U.S.	Atlantic Transport Co.	600·0	65·3	31·1
15,434	Volendam (T.)	15	1922	Holl.	Holland Amerika Lijn	550·2	67·3	32·6
15,355	Amerikaland (M.)	?	1925	Swed.	Augf. Akt. Tirfing	561·3	72·2	44·1
15,357	Svealand (M.)	?	1925	Swed.	Augf. Akt. Tirfing	561·3	72·2	44·1
15,286	Berlin	16	1925	Ger.	Norddeutscher Lloyd	549·3	69·2	34·8
15,248	Chitral	16	1925	Br.	P. & O. S. N. Co.	526·3	70·3	42·3
15,186	Minnedosa (T. & R.)	16½	1918	Br.	Canadian Pacific Co.	520·0	67·2	41·8
15,183	Melita (T. & R.)	16½	1918	Br.	Canadian Pacific Co.	520·0	67·2	50·3
15,147	Massilia (T. & R.)	20	1920	Fr.	Cie. de Nav. Sud Atlantique	577·1	64·1	37·0
15,116	Comorin	16	1925	Br.	P. & O. S. N. Co.	523·5	70·2	42·3
15,105	Athos II. (T.)	?	1925	Fr.	Messageries Maritimes	541·3	66·0	—
15,105	D'Artagnan	?	1924	Fr.	Messageries Maritimes	543·5	65·0	41·4
15,121	Cathay	16	1925	Br.	P. & O. S. N. Co.	523·5	70·2	42·3
14,947	Euripides (T. & R.)	15	1914	Br.	G. Thompson & Co.	550·7	67·4	44·1
14,930	Arlanza (T. & R.)	17	1912	Br.	Royal Mail Co.	570·3	65·3	33·3
14,878	Megantic	17	1909	Br.	Oceanic S. N. Co.	550·4	67·3	41·2
14,853	Ormonde (T.)	18	1917	Br.	Orient S. N. Co.	580·5	66·7	40·5
14,825	Chenonceaux (T.)	?	1922	Fr.	Messageries Maritimes	543·4	65·1	41·1
14,654	Lutetia (T. & R.)	20	1913	Fr.	Cie. de Nav. Sud Atlantique	579·0	64·1	36·7
14,652	Ulysses	14	1913	Br.	China Mutual S. N. Co.	563·2	68·4	40·2
14,642	Pieter Corneliszoon Hooft (M.)	?	1925	Du.	"Nederland" S. Maats.	541·3	67·8	46·5
14,588	Dresden	16	1914	Ger.	Norddeutscher Lloyd	550·0	67·3	35·1
14,629	Nestor	14	1913	Br.	Ocean S.S. Co.	563·2	68·4	31·2

† * See notes on p. 481.

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LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots.)	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
14,457	Taiyo Maru	16	1911	Jap.	Govt. of Japan	560·0	65·3	31·2
14,305	Charles G. Black	?	1921	U.S.	Standard Oil Co.	550·3	72·2	43·7
14,187	President Lincoln (T.)	17	1921	U.S.	Robert Dollar Co.	516·5	72·2	27·8
14,187	President Madison (T.)	17	1921	U.S.	Admiral Oriental Line	516·5	72·2	27·8
14,174	President Jefferson (T.)	17	1920	U.S.	Admiral Oriental Line	516·5	72·2	27·8
14,127	President McKinley (T.)	17	1921	U.S.	Admiral Oriental Line	516·5	72·2	27·8
14,127	President Wilson (T.)	17	1921	U.S.	Robert Dollar Co.	516·5	72·2	27·8
14,124	President Jackson (T.)	17	1921	U.S.	Admiral Oriental Line	517·0	72·2	27·8
14,123	President Cleveland (T.)	17	1921	U.S.	Robert Dollar Co.	517·0	72·2	36·8
14,123	President Pierce (T.)	17	1921	U.S.	Robert Dollar Co.	517·0	72·2	27·8
14,123	President Taft (T.)	17	1921	U.S.	Robert Dollar Co.	517·0	72·2	27·8
14,119	President Grant (T.)	17	1921	U.S.	Admiral Oriental Line	517·0	72·2	27·8
14,072	Oropesa (T.)	14	1920	Br.	Pacific S.W. Co.	530·0	66·3	41·2
14,054	John D. Archbold	?	1921	U.S.	Standard Oil Co.	570·2	75·1	42·6
14,054	William Rockefeller	?	1921	U.S.	Standard Oil Co.	554·9	75·3	43·0
14,030	Alaunia (T.)	15	1925	Br.	Cunard Co.	519·6	65·2	39·2
14,013	Ascania (T.)	15	1925	Br.	Cunard Co.	520·0	65·3	39·0
13,984	Aurania (T.)	15	1924	Br.	Cunard Co.	519·7	65·3	39·2
13,950	Andania (T.)	15	1922	Br.	Cunard Co.	520·2	65·3	39·2
13,912	Ausonia (T.)	15	1921	Br.	Cunard Co.	520·0	65·3	39·1
13,869	President Harding (T.)	18	1921	U.S.	U.S.S.B.	516·5	72·2	27·8
13,869	President Roosevelt (T.)	18	1922	U.S.	United States Shipping	516·5	72·2	27·8
13,868	Gelria	16	1913	Holl.	Hollandsche Lloyd	541·1	65·8	35·3
13,867	Antonia (T.)	15	1921	Br.	Cunard Co.	519·9	65·3	39·1
13,856	Esperance Bay (T.)	15	1922	Br.	Australian Comm. Line	530·9	68·3	39·9
13,855	Moreton Bay (T.)	15	1921	Br.	Australian Comm. Line	530·6	68·3	39·9
13,853	Largs Bay (T.)	15	1921	Br.	Australian Comm. Line	530·9	68·3	39·9
13,840	Hobson's Bay (T.)	15	1922	Br.	Australian Comm. Line	530·6	68·3	39·9
13,839	Jervis Bay (T.)	15	1922	Br.	Australian Comm. Line	530·6	68·3	39·9
13,789	Southern Cross (T.)	17	1920	U.S.	Munson S.S. Line	516·5	72·2	27·8
13,750	Monte Olivia (M.)	14½	1924	Ger.	Hamburg Sud-Amer. Ges.	500·6	65·8	37·9
13,736	American Legion (T.)	17	1920	U.S.	Munson S.S. Line	516·5	72·2	27·8
13,712	Pan America (T.)	17	1921	U.S.	Munson S.S. Line	517·0	72·2	27·8
13,712	Western World (T.)	17	1921	U.S.	Munson S.S. Line	517·0	72·2	41·0
13,682	André Lebon	14	1913	Fr.	Messageries Maritimes	508·2	61·6	45·8
13,625	Monte Sarmiento (M.)	14½	1924	Ger.	Hamburg Sud-Amer. Ges.	500·6	65·8	37·9
13,615	Cap Norte	14	1922	Ger.	Hamburg Sud-Amer. Ges.	499·5	64·0	38·7
13,589	Antonio Delfino	14	1921	Ger.	Hamburg Sud-Amer. Ges.	499·5	64·0	38·7
13,483	München	16	1922	Ger.	Norddeutscher Lloyd	526·9	65·0	34·7
13,475	Letitia (T.)	15½	1925	Br.	Anchor-Donaldson	525·7	66·4	29·5
13,465	Athenia (T.)	15½	1923	Br.	Anchor-Donaldson	526·3	66·4	38·1
13,415	Niagara (T. & R.)	18	1913	Br.	Union S.S. Co. of N.Z.	524·7	66·3	34·5
13,401	Tenyo Maru (T.)	16	1908	Jap.	Nippon Yusen Kaisha	558·0	61·9	35·5
13,367	Stuttgart	16	1923	Ger.	Norddeutscher Lloyd	527·0	65·0	34·7
13,361	Balmoral Castle	17	1910	Br.	Union Castle Co.	570·0	64·5	38·9
13,330	Edinburgh Castle	17	1910	Br.	Union Castle Co.	570·2	64·7	38·7
13,248	Voltaire	14½	1923	Br.	Lamport & Holt, Ltd.	510·6	64·3	39·3
13,246	C. A. Larsen	?	1913	Nor.	Hvalfanger A/S Rosshavet	527·2	66·6	33·9
13,233	Vandyck (T.)	14½	1921	Br.	Lamport & Holt, Ltd.	510·6	64·3	39·3
13,156	Stavangerfjord	16	1918	Nor.	Norske Amerikalinje	532·5	64·2	29·3
13,154	Chilore (T.)	?	1922	U.S.	Guaranty Trust Co.	549·6	72·2	40·5
13,148	Barrabool	14½	1922	Br.	P. & O. Co.	519·9	64·4	37·8
13,144	Baradine	14½	1921	Br.	P. & O. Co.	519·9	64·4	37·8
13,056	San Fernando (T.)	?	1919	Br.	Eagle Oil Transport Co.	530·4	69·4	42·2
13,039	Balranald	14½	1922	Br.	P. & O. Co.	519·8	64·2	29·8
13,039	Bendigo	14½	1922	Br.	P. & O. Co.	519·8	64·2	37·8
13,039	Shinyo Maru (T.)	16	1911	Jap.	Toyo Kisen Kaisha	558·0	61·9	35·5
13,037	San Felix (T.)	11	1921	Br.	Eagle Oil Transport Co.	530·4	69·4	42·2
13,033	Ballarat	14½	1921	Br.	P. & O. Co.	519·8	64·2	37·8
13,031	San Fabian (T.)	11	1922	Br.	Eagle Oil Transport Co.	530·5	69·4	42·2
12,989	Paul Lecat	14	1911	Fr.	Messageries Maritimes	510·7	61·6	42·0
12,975	Kenilworth Castle	17	1904	Br.	Union Castle Co.	570·2	64·7	38·7
12,973	Armadale Castle	17	1903	Br.	Union Castle Co.	570·1	64·5	39·0
12,915	San Gerardo (T.)	11	1922	Br.	Eagle Oil Transport Co.	530·2	68·5	42·1
12,910	San Gaspar (T.)	11	1921	Br.	Eagle Oil Transport Co.	530·2	68·5	42·1
12,864	Avila (T.)	16	1927	Br.	Blue Star Line	510·2	68·2	33·9
12,857	Avelona (T.)	16	1927	Br.	Blue Star Line	510·2	68·2	33·9
12,842	San Florentino (T.)	?	1919	Br.	Eagle Oil Transport Co.	530·4	68·6	42·0
12,838	Almeda (T.)	16	1926	Br.	Blue Star Line	512·2	68·3	34·0
12,838	Arandora (T.)	16	1927	Br.	Blue Star Line	512·2	68·3	34·0
12,836	Andalucia (T.)	16	1927	Br.	Blue Star Line	512·2	68·3	34·0
12,835	Stockholm	15½	1900	Swed.	Svenska Amerika Linien	547·1	62·1	34·6
12,768	Albania (T.)	14	1920	Br.	Cunard Co.	523·1	64·0	43·9
12,692	Porthos	13½	1914	Fr.	Messageries Maritimes	510·8	61·6	42·1
12,686	Suevic	13	1901	Br.	Oceanic S.N. Co.	550·2	63·3	39·9

† * See notes on p. 481.

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LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
12,678	Rochambeau (T. & R.)	16½	1911	Fr.	Cie. Gén. Transatlantique	559·4	63·7	43·3
12,663	Runic	13	1900	Br.	Oceanic S.N. Co.	550·2	63·3	39·9
12,642	City of Los Angeles	16	1899	U.S.	Los Angeles S.S. Co.	560·6	62·3	35·9
12,578	Presidente Wilson	17	1912	Ital.	Soc. Triestino "Cosulich"	477·5	60·2	43·2
12,546	Walmer Castle	17	1902	Br.	Union Castle Co.	570·5	64·4	38·6
12,535	Rijndam	15	1901	Holl.	Holland-Amerika Lijn	550·3	62·3	26·2
12,528	Noordam	15	1902	Holl.	Holland-Amerika Lijn	550·3	62·3	34·0
12,510	Gulfpride (M.)	?	1927	U.S.	Gulf Refining Co. Inc..	525·0	74·3	31·6
12,420	Metagama	16	1915	Br.	Canadian Pacific Co.	500·4	64·2	37·9
12,385	Saxon	17	1900	Br.	Union Castle Co.	570·5	64·4	38·6
12,367	Corinthic	13	1902	Br.	Oceanic S.N. Co.	500·3	63·3	45·0
12,366	Athenic	13	1901	Br.	Oceanic S.N. Co.	500·3	63·3	45·0
12,354	Tamaroa (T.)	15	1922	Br.	G. Thompson & Co.	500·4	63·2	39·6
12,352	Ionic	13	1902	Br.	Oceanic S.N. Co.	500·3	63·3	45·0
12,333	Mataroa (T.)	15	1922	Br.	G. Thompson & Co.	500·4	63·2	39·6
12,286	San Melito	?	1914	Br.	Eagle Oil Transport Co.	530·0	66·5	33·5
12,263	Champollion	15	1924	Fr.	Messageries Maritimes	495·1	62·7	40·5
12,257	Oroya (T.)	14	1923	Br.	Pacific S.N. Co.	525·3	62·8	32·1
12,239	Mariette Pacha	15	1925	Fr.	Messageries Maritimes.	508·5	62·6	43·6
12,223	Finland	?	1902	U.S.	Inter. Mer. Marine Co. Inc.	560·0	60·2	38·4
12,222	Medic	13	1899	Br.	Oceanic S.N. Co.	550·2	63·3	39·9
12,221	Persic	13	1899	Br.	Oceanic S.N. Co.	550·2	63·3	39·9
12,220	Lafayette (T. & R.)	18½	1915	Fr.	Cie. Gén. Transatlantique	546·7	64·0	34·8
12,184	Osterley	18	1909	Br.	Orient S.N. Co.	535·0	63·2	34·1
12,153	Devonian	15	1902	Br.	F. Leyland & Co.	582·0	60·3	38·3
12,133	Orvieto	18	1909	Br.	Orient S.N. Co.	535·3	64·0	38·6
12,112	Rotorua	15	1911	Br.	Federal S.N. Co.	526·4	61·4	33·3
12,097	San Lorenzo	11	1914	Br.	Eagle Oil Transport Co.	527·5	66·6	42·0
12,074	Cadillac	10½	1917	Br.	Anglo-American Oil Co.	530·2	66·3	33·8
12,070	Saranac	10½	1918	Br.	Anglo-American Oil Co.	530·5	66·3	42·7
12,041	Orsova	18	1909	Br.	Orient S.N. Co.	536·2	63·3	34·3
12,040	Sibajak (M.)	16½	1927	Hol.	Rotterdamsche Lloyd	506·6	62·7	35·2
12,029	San Nazario	11	1914	Br.	Eagle Oil Transport Co.	525·5	66·5	41·4
12,028	San Jeronimo	11	1914	Br.	Eagle Oil Transport Co.	525·5	66·5	33·9
12,015	Arcadian	16½	1908	Br.	Royal Mail Co.	520·3	62·3	31·8
12,003	Colombo	17	1917	Ital.	Nav. Gen. Italiana	518·0	64·0	24·2
11,996	Providence	17	1915	Fr.	Cie. Fr. de N. (Cyp. Fabre)	511·8	59·7	43·5
11,949	Argyllshire	14	1911	Br.	Turnbull, Martin & Co.	526·2	61·4	33·3
11,948	Suffren	15	1901	Fr.	Cie. Gén. Transatlantique	528·0	62·3	34·7
11,920	Orazio (M.)	?	1927	Ital.	Nav. Gen. Italiana	482·2	61·9	33·4
11,920	Virgilio (M.)	?	1927	Ital.	Nav. Gen. Italiana	482·2	61·9	33·4
11,885	Patria	17	1913	Fr.	Cie. Fr. de N. (Cyp. Fabre)	487·2	59·2	40·1
11,877	San Patricio	?	1915	Br.	Eagle Oil Transport Co.	530·0	66·6	33·5
11,850	Frederick VIII.	17	1913	Den.	Forenede Damps. S.	523·5	62·3	38·3
11,810	Korea Maru	16	1901	Jap.	Toyo Kisen Kaisha	551·7	63·2	40·8
11,796	Mahana (T.)	13½	1917	Br.	Shaw Savill & Albion Co.	500·9	63·3	39·6
11,790	Siberia Maru	16	1901	Jap.	Toyo Kisen Kaisha	551·7	63·2	21·8
11,667	Minnesota	16	1901	Br.	F. Leyland & Co.	561·6	60·2	38·2
11,577	Orcoma	14½	1908	Br.	Pacific S. N. Co.	511·6	62·2	29·1
11,540	Northumberland (T.)	15	1915	Br.	Federal S. N. Co.	530·5	63·0	31·9
11,518	Kaisar-i-Hind	18½	1914	Br.	P. & O. S. N. Co.	520·0	61·2	33·1
11,484	Darro	13½	1912	Br.	Royal Mail Co..	500·7	62·3	40·2
11,484	Demerara	13½	1912	Br.	Royal Mail Co.	500·7	62·3	40·2
11,483	Desna	13½	1912	Br.	Royal Mail Co..	500·7	62·3	40·2
11,477	Deseado	13½	1912	Br.	Royal Mail Co..	500·7	62·3	40·2
11,469	Sierra Cordoba	14½	1923	Ger.	Norddeutscher Lloyd	490·5	61·8	34·3
11,455	King Alexander	15	1896	Br.	Byron S.S. Co.	550·5	60·2	34·9
11,446	Philoctetes (T.)	14	1922	Br.	China Mutual S.N. Co.	511·9	63·2	41·1
11,430	Sierra Morena	14½	1924	Ger.	Norddeutscher Lloyd	490·5	61·8	34·3
11,426	Achilles (T.)	14	1920	Br.	Ocean S.S. Co.	507·4	63·2	41·1
11,406	Slamat (T.)	15	1923	Holl.	Rotterdamsche Lloyd	482·5	62·0	35·0
11,405	Esperia (T.)	21	1918	Ital.	Soc. Ital. di Servizi Marittimi	492·1	61·7	34·1
11,397	Transbalt	?	1899	Russ.	Govt. Black & Azov Seas S.S. Co.	501·1	62·2	46·3
11,392	Sierra Ventana	14½	1923	Ger.	Norddeutscher Lloyd	490·5	61·8	34·3
11,375	Sphinx	14½	1914	Fr.	Messageries Maritimes	478·0	60·7	40·6
11,347	Tyndareus	14	1916	Br.	Ocean S.S. Co.	507·0	63·2	41·6
11,343	Thuringia (T.)	13½	1922	Ger.	Hamburg-Amerika Linie	473·6	60·7	41·9
11,343	Westphalia (T.)	13½	1923	Ger.	Hamburg-Amerika Linie	473·6	60·7	41·9
11,337	Cuba (T.)	16	1923	Fr.	Cie. Gén. Transatlantique	476·0	62·3	35·1
11,321	Sarpedon (T.)	15	1923	Br.	Ocean S.S. Co.	499·0	62·3	34·9
11,314	Patroclus (T.)	15	1923	Br.	China Mutual S.N. Co.	498·8	62·3	26·4
11,309	Montrolite (M.)	?	1926	Br.	Imperial Oil, Ltd.	510·9	68·2	37·9
11,300	Canadolite (M.)	?	1926	Br.	Imperial Oil, Ltd.	510·0	68·0	38·0
11,293	Llanstephan Castle	14	1914	Br.	Union Castle Co.	500·5	63·3	37·2

† * See notes on p. 481.

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LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
11,243	Hororata	14	1914	Br.	New Zealand Shipping Co.	511·1	64·2	32·0
11,231	Themistocles	15	1911	Br.	G. Thompson & Co.	500·6	62·3	39·4
11,223	Demosthenes (T. & R.)	15	1911	Br.	G. Thompson & Co.	500·6	62·3	39·4
11,202	Berrima	14½	1913	Br.	P. & O. Co..	500·1	62·2	37·8
11,199	Borda	14½	1914	Br.	P. & O. Co..	500·0	62·2	37·8
11,198	Hector (T.)	15	1924	Br.	Ocean S.S. Co., Ltd.	498·8	62·3	26·4
11,182	Drottningholm (T.)	16½	1905	Swed.	Svenska Amerika Linien	517·0	60·0	38·0
11,181	Benalla	14½	1913	Br.	P. & O. Co..	500·1	62·2	29·8
11,174	Antenor (T.)	15	1925	Br.	China Mutual S.N. Co.	497·7	62·2	35·0
11,170	Tamiahua	?	1921	U.S.	Southern Pacific S.S. Lines	500·0	71·2	31·2
11,168	La Savoie	21	1900	Fr.	Cie. Gén. Transatlantique	563·1	60·0	35·9
11,167	Beltana	14½	1912	Br.	P. & O. Co..	500·1	62·2	37·8
11,158	Remuera	14	1911	Br.	New Zealand Shpg. Co.	485·0	62·3	41·0
11,155	Espagne	18½	1909	Fr.	Cie. Gén. Transatlantique	537·8	60·8	39·0
11,140	Jan Pieterszoon Coen	15	1915	Du.	"Nederland" Stoom. Maats.	503·5	60·6	35·8
11,103	Edison	13	1896	Br.	Byron S.S. Co.	523·1	60·1	34·9
11,089	Macedonia	18	1904	Br.	P. & O. S.N. Co.	530·4	60·4	25·5
11,081	Achilles	?	1915	U.S.	Panama Canal	514·0	65·2	36·5
11,073	Avon	16½	1907	Br.	Royal Mail Co..	520·3	62·3	31·8
11,013	Bergensfjord	16	1913	Nor.	Norske Amerikalinje	512·4	61·2	29·4
10,986	Malwa	18	1908	Br.	P. & O. S. N. Co.	540·0	61·3	24·6
10,954	Morea	18	1908	Br.	P. & O. S. N. Co.	540·0	61·2	24·7
10,951	Huntingdon	14	1920	Br.	Federal S.N. Co.	520·7	64·2	38·1
10,946	Mantua	18	1909	Br.	P. & O. S. N. Co.	540·0	61·3	24·6
10,946	Norfolk	14	1918	Br.	Federal S.N. Co.	520·7	64·2	38·1
10,937	Cumberland	14	1919	Br.	Federal S.N. Co.	520·0	64·2	29·0
10,936	Fushimi Maru	14½	1914	Jap.	Nippon Yusen Kaisha	513·0	63·5	37·5
10,923	Hertford	14	1917	Br.	Federal S.N. Co.	520·7	64·2	38·1
10,910	Ulysses	?	1915	U.S.	Panama Canal	514·0	65·2	36·5
10,902	City of Paris (T.)	14½	1922	Br.	City Line, Ltd.	484·7	59·3	32·6
10,893	Robert Dollar	13	1920	Br.	Dollar S.S. Lines, Ltd.	523·5	65·7	37·5
10,870	Ruahine	14	1909	Br.	New Zealand Shipping Co.	480·6	60·3	32·1
10,850	Cambridge	14	1916	Br.	Federal S.N. Co.	524·5	65·7	37·3
10,836	Tjibesar (T.)	12	1922	Holl.	Java-China-Japan Lijn	500·1	63·7	39·2
10,833	Cristobal Colon (T.)	17	1922	Sp.	Cia Trasatlantica	499·4	61·0	32·3
10,826	Bremen	15½	1900	Ger.	Norddeutscher Lloyd..	523·5	60·2	34·7
10,786	Llandaff Castle	14½	1926	Br.	Union Castle Line	471·1	61·7	39·0
10,772	Indrapoera (M.)	15	1925	Holl.	Rotterdamsche Lloyd	479·5	60·2	35·1
10,743	Marburn	15	1900	Br.	Allan Line	500·6	59·2	39·8
10,725	Andrea F. Luckenbach (T.)	13	1919	U.S.	Luckenbach S.S. Co.	496·0	68·2	37·2
10,687	Marloch (T.)	15	1904	Br.	Allan Line	520·0	60·4	38·0
10,672	Suwa Maru	14½	1914	Jap.	Nippon Yusen Kaisha	516·0	62·6	34·9
10,662	Lewis Luckenbach (T.)	13	1919	U.S.	Luckenbach S.S. Co.	496·0	68·0	40·0
10,660	Vauban	13½	1912	Br.	Lamport & Holt, Ltd.	495·5	60·8	28·7
10,646	Stuartstar (T.)	?	1926	Br.	Blue Star Line	475·8	67·3	36·6
10,616	Cornwall (T.)	14	1920	Br.	Federal S. N. Co.	495·1	63·1	40·3
10,609	Llandovery Castle	14½	1925	Br.	Union Castle Co.	471·1	61·7	39·0
10,602	Razmak	19	1925	Br.	P. & O. S. N. Co.	500·4	63·2	34·0
10,600	Rodneystar (T.)	?	1926	Br.	Blue Star Line	475·9	67·3	36·6
10,583	Napierstar (T.)	?	1927	Br.	Blue Star Line	476·0	67·3	36·6
10,560	Shropshire (M.)	?	1926	Br.	Bibby S.S. Co.	483·6	60·3	31·8
10,558	President Adams	14	1921	U.S.	Robert Dollar Co.	502·1	62·2	28·3
10,558	President Garfield	14	1921	U.S.	Robert Dollar Co.	502·1	62·2	28·3
10,551	Alfonso XIII. (T.)	17	1921	Sp.	Cia. Trasatlantica	?	?	?
10,533	President Harrison	14	1921	U.S.	Robert Dollar Co.	502·1	62·2	28·3
10,533	President Hayes	14	1920	U.S.	Robert Dollar Co.	502·1	62·2	28·3
10,533	President Monroe	14	1920	U.S.	Robert Dollar Co.	502·1	62·2	28·3
10,533	President Van Buren	14	1920	U.S.	Robert Dollar Co.	502·1	62·2	28·3
10,502	Chicago	16	1908	Fr.	Cie. Gén. Transatlantique	508·4	57·8	39·5
10,500	Cheshire (M.)	?	1927	Br.	Bibby S.S. Co.	483·6	60·3	31·8
10,500	President Polk	14	1921	U.S.	Robert Dollar Co.	502·1	62·2	28·3
10,500	Staffordshire (M.)	15½	1928	Br.	Bibby Steam Ship Co., Ltd.	483·6	62.3	32·0
10,494	Vestris	13½	1912	Br.	Lamport & Holt, Ltd.	495·5	60·8	28·7
10,480	Lemoyne	?	1926	Br.	Canada S.S. Line	621·1	70·2	25·4
10,441	Doricstar (T.)	12½	1921	Br.	Blue Star Line	499·8	64·0	37·0
10,428	Winifredian	14	1899	Br.	F. Leyland & Co.	552·5	59·3	28·9
10,421	Haruna Maru (T.)	15½	1922	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,420	Hakone Maru (T.)	15½	1921	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,413	Hakozaki Maru (T.)	15½	1922	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,389	Herminius	13½	1911	Br.	Shaw, Savill & Albion Co.	477·6	63·1	31·3
10,388	Helen Vinmont	?	1921	U.S.	Calefornia Petroleum Corp.	500·0	68·2	29·3
10,388	Agwistone	?	1921	U.S.	Atlantic, Gulf & W. Indies S.S. Co.	500·0	68·2	29·3
10,380	Hakusan Maru (T.)	15½	1923	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,355	Johan de Witt	15	1920	Du.	Nederland Stoom. Maats.	482·2	59·2	34·8

† * See notes on p. 481.

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LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
10,354	Diomed (T.)	14	1922	Br.	China Mutual S.N. Co.	491·0	62·4	31·1
10,348	Infanta Isobel de Borbon (T. & R.)	17	1913	Sp.	Cia. Trasatlantica	481·9	61·3	32·7
10,304	Calchas (T.)	14	1921	Br.	Ocean S.S. Co.	490·8	62·4	39·6
10,278	Menelaus (T.)	14	1923	Br.	Ocean S.S. Co.	495·5	62·3	39·6
10,276	Perseus (T.)	14	1923	Br.	China Mutual S.N. Co.	490·5	62·3	39·6
10,268	Bernardin de Saint Pierre	?	1925	Fr.	Messageries Maritimes.	455·8	60·8	41·0
10,263	City of Honolulu	?	1900	U.S.	Los Angeles S.S. Co.	523·5	60·1	34·7
10,241	Exploration Grandidier	?	1924	Fr.	Messageries Maritimes	455·8	60·7	41·1
10,229	Ixion	14	1912	Br.	China Mutual S.N. Co.	506·0	60·3	39·5
10,224	Talthybius	14	1912	Br.	Ocean S.S. Co.	506·0	60·3	39·5
10,196	Araguaya	16½	1906	Br.	Royal Mail Co..	515·2	61·3	30·5
10,184	Yorkshire (T.)	15	1920	Br.	Bibby S.S. Co.	482·4	58·3	40·4
10,171	Flandria (T.)	14	1922	Holl.	Hollandsche Lloyd	450·1	59·2	41·7
10,138	City of Nagpur	14	1922	Br.	City Line, Ltd.	469·9	59·3	40·0
10,137	Reina Victoria-Eugenia (T. & R.)	17	1913	Sp.	Cia. Trasatlantica	480·0	61·3	40·7
10,123	Meduana (T.)	13½	1922	Fr.	Cie. de Nav. Sud Atlantique	484·2	59·3	35·0
10,123	Mosella (T.)	13½	1922	Fr.	Cie. de Nav. Sud Atlantique	484·2	59·3	27·2
10,121	General Belgrano	?	1913	Ger.	Akt. Ges. Hugo Stinnes	491·6	59·1	35·6
10,117	Vasari	12	1909	Br.	Lamport & Holt, Ltd.	486·0	59·3	27·4
10,092	Commissaire Ramel	?	1920	Fr.	Messageries Maritimes	478·8	59·2	33·4
10,058	Aeneas	14	1910	Br.	Ocean S.S. Co.	493·0	60·4	28·6
10,048	Ascanius	14	1910	Br.	Ocean S.S. Co.	493·0	60·4	28·6
10,042	Beaverford (T.)	15½	1928	Br.	Canadian Pacific Rly. Co.	503·0	61·8	37·5
10,041	Beaverhill (T.)	15½	1928	Br.	Canadian Pacific Rly. Co.	503·0	61·8	37·5
10,012	Oscar II.	16	1901	Den.	Forenede Damps. S.	500·8	58·3	37·6
10,006	Tilawa	12	1924	Br.	British India S.N. Co.	451·0	59·3	36·8
10,000	Anchises	14	1911	Br.	Ocean S.S. Co.	493·0	60·4	28·6
10,000	Talma	12	1923	Br.	British India S. N. Co.	451·0	59·3	36·8

† * See notes on p. 481.

NUMBER AND TONNAGE OF MOTOR VESSELS (EXCLUDING VESSELS FITTED WITH AUXILIARY MOTORS) OWNED BY VARIOUS NATIONS.

	June, 1922.		June, 1925.		June, 1927.		June, 1923.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Gt. Brit. & Ireland	214	355,461	220	733,734	291	1,167,301	351	1,520,826
British Dominions	99	36,973	69	37,272	100	94,959	117	148,570
United States *	142	183,083	132	216,889	188	349,786	205	441,145
Denmark	104	165,810	56	171,964	68	219,246	71	272,432
France	65	33,656	27	34,824	26	34,377	28	47,191
Germany	99	73,127	78	233,612	112	315,141	146	433,707
Holland	95	75,684	64	124,262	85	192,807	194	296,115
Italy	91	88,330	41	124,901	64	363,822	76	386,632
Japan	8	6,090	42	41,376	73	99,290	91	135,187
Norway	240	197,973	156	324,567	197	580,551	218	736,088
Spain	47	18,104	17	18,442	25	45,927	28	51,653
Sweden	160	166,679	120	259,900	119	295,646	122	349,181
Other countries	224	144,293	88	67,501	120	207,718	153	309,837
World's total *.	1,588	1,535,263	1,110	2,389,244	1,468	3,966,571	1,808	5,153,116

* Excluding American Great Lakes vessels.

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NUMBERS OF VESSELS CLASSED BY VARIOUS CLASSIFICATION SOCIETIES.*

Society.	1913.	1919.	1921.	1923.	1925.	1927.	1928.
Lloyd's Register	10,466	9175	10,154	10,296	9973	9947	10,077
British Corporation	876	1002	1190	1306	1253	1344	1417
American Bureau of Shipping (Record of American and Foreign Shipping)	846	926	2216	2392	2131	1893	1928
American Bureau of Shipping (Gt. Lakes Register)	572	442	392	416	383	359	383
Bureau Veritas	5165	5706	6387	4998	5135	5043	5097
Norske Veritas	1504	955	1109	1242	1220	1323	1307
Registro Italiano	1442	699	1280	1872	1826	1623	1693
Germanischer Lloyd	2848	—‡	2219	2799	2855	2832	2914
Veritas Adriatico	1146	516	471	†	†	†	†

* Many vessels, of course, are not exclusively classed in one Register.
† The Veritas Adriatico is now amalgamated with the Registro Italiano.
‡ No data available.

FLUCTUATIONS IN THE PRICE OF A NEW, READY, 7,500-TON (D.W.)† CARGO STEAMER.

Period.		Price per ton (D.W.)
	£	£
1898 (Sept.)	**48,500**	**6·7**
1900 (Nov.)	**60,630***	**8·4**
1905 (June)	**36,500**	**5·0**
1908 (June)	**36,000**	**4·9**
1910 (Jan.)	**39,000**	**5·3**
1912 (Nov.)	**58,000**	**7·7**
1914 (June)	**42,500**	**5·7**
1915 (Jan.)	**60,000**	**8·0**
1915 (June)	**82,500**	**11·0**
1915 (Sept.)	**93,750**	**12·5**
1916 (Jan.)	**125,000**	**16·7**
1916 (June	**180,000**	**24·0**
1916 (Dec.)	**187,500**	**25·0**
1918 (Jan.)	**165,000**	**22·0**
1918 (June)	**180,500**	**24·1**
1919 (Jan.)	**169,000**	**22·5**
1919 (June)	**195,000**	**26·0**
1920 (Jan.)	**232,500**	**31·0**
1920 (March)	**258,750**	**34·5**
1920 (June)	**180,000**	**24·0**
1921 (Jan.)	**105,000**	**14·0**
1921 (June)	**63,750**	**8·5**
1922 (Jan.)	**60,000**	**8·0**
1922 (June)	**62,000**	**8·3**
1923 (Jan.)	**65,625**	**8·8**
1923 (June)	**62,500**	**8·3**
1924 (Jan.)	**60,000**	**8·0**
1924 (June)	**60,000**	**8·0**
1925 (Jan.)	**61,500**	**8·2**
1925 (June)	**55,500**	**7·4**
1926 (Jan.)	**52,500**	**7·0**
1926 (June)	**52,500**	**7·0**
1927 (Jan.)	**60,750**	**8·1**
1927 (June)	**63,000**	**8·4**
1928 (June)	**57,000**	**7·6**

Compiled from "Fairplay," July 5, 1928.

NOTE.—The highest and lowest prices are given in heavy type.

* Highest pre-war figure.

† The table is now based on a single-deck steamer of very plain specification, built to Lloyd's Register latest rules, partly of continental steel, with no deep tank, donkey boiler, or Grain Act requirements; length 380 ft., breadth 49 ft., depth 29 ft., carrying 7500 tons deadweight at 10½ knots on 23′ 8″ draught.

From 1898 to 1906 the vessel used was 360 ft. long by 48 ft. beam by 30′ 10″ depth, carrying 7000 to 7250 tons deadweight on 24′ 6″ draught. In 1906 the revised Board of Trade rules enabled the freeboard to be reduced, thus increasing the deadweight by 60 to 80 tons, while in 1910 changes in the Rules of Lloyd's Register of Shipping permitted of lighter scantlings, adding an additional 150 tons to the deadweight.

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NUMBER AND TONNAGE OF MERCHANT VESSELS LAUNCHED.*

	1913.		1919.		1921.		1923.		1925.		1927.	
	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	688	1,932,153	612	1,620,442	426	1,538,052	222	645,651	342	1,084,633	371	1,225,873
British Dominions †	77	26,744	235	298,495	49	118,303	41	37,072	47	32,320	24	20,119
United States †	182	228,232	852	3,579,826	166	995,129	69	96,491	94	78,766	58	124,270
Austria-Hungary	17	61,757	—	—	—	—	—	—	—	—	—	—
Denmark	31	40,932	46	37,766	37	77,238	24	49,479	21	73,268	20	72,038
France	89	176,095	34	32,633	65	210,663	27	96,644	35	75,569	22	44,335
Germany	162	465,226	No returns.		242	509,064	109	345,062	121	406,374	105	289,622
Holland	95	104,296	100	137,086	98	232,402	35	65,632	47	78,823	68	119,790
Italy	38	50,356	32	82,713	85	164,748	21	66,523	31	142,046	25	101,076
Japan	152	64,664	133	611,883	43	227,425	44	72,475	23	55,784	19	42,359
Norway	74	50,637	82	57,578	35	51,458	48	42,619	48	28,805	12	5,363
Spain	12	8,488	41	52,609	11	47,256	7	4,488	1	127	5	22,899
Sweden	25	18,524	53	50,971	27	65,911	10	20,118	17	53,750	18	37,361
Other Countries	71	34,967	36	26,755	81	81,374	27	20,410	17	19,371	32	85,495
World's Total	1713	3,282,071	2256	6,588,757	1365	4,319,023	684	1,562,664	844	2,129,536	794	2,230,731

* Figures given include all steamers, motorships, and sailing vessels of 100 gross tons and upwards.

† Excluding vessels built at ports on the Great Lakes of America.

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MERCHANT VESSELS UNDER CONSTRUCTION.*

	1913.		1919.		1921		1923.		1925.		1927.	
	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	518	1,956,606	757	2,994,249	515	2,640,319	360	1,395,181	217	885,013	338	1,579,713
British Dominions †	27	19,468	100	218,440	34	66,469	19	33,355	16	20,884	22	21,937
United States †	62	133,187	589	2,818,855	42	216,278	25	42,285	40	89,211	22	92,870
Austria-Hungary	16	63,300	—	—	—	—	—	—	—	—	—	—
Denmark	12	25,362	56	100,335	27	63,070	28	62,196	17	60,693	19	97,710
France	39	229,020	65	216,775	76	352,635	24	110,725	39	167,256	23	115,029
Germany	102	544,682	No returns.		No returns.		92	324,184	53	234,145	86	472,295
Holland	41	126,867	126	328,338	123	313,879	45	112,811	36	108,894	37	174,887
Italy	23	53,809	125	314,547	122	393,832	38	119,663	41	309,578	44	183,216
Japan	14	47,797	64	309,474	35	144,912	20	63,207	13	52,210	13	68,870
Norway	49	42,614	61	92,719	40	61,559	29	33,735	20	12,980	7	7,180
Russia	1	5,620	—	—	—	—	—	—	—	—	35	87,658
Spain	3	6,855	28	107,463	16	69,937	10	23,065	8	36,125	13	48,722
Sweden	18	18,400	67	110,765	33	78,269	19	43,159	18	55,180	17	100,700
Other Countries	19	23,829	29	68,708	62	55,784	40	31,470	18	12,376	14	63,434
World's Total	939	3,297,411	2067	7,680,663	1125	4,456,943	749	2,395,026	536	2,044,545	690	3,118,721

* The figures give the number and aggregate gross tonnage of steamers, motorships, and sailing vessels under construction on December 31st of each year.

† Excluding vessels building at ports on the Great Lakes of America.

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ANNUAL MERCHANT SHIPPING LOSSES OF THE WORLD.*

	1913.			1919.			1922.			1924.			1926.			1927.		
	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.
Gt. Brit. & Ireland	113	199,453	1·07	99	151,653	·92	83	122,088	·63	74	111,207	·58	55	111,780	·58	52	64,419	0·34
British Dominions	37	20,091	1·16	89	52,539	2·56	43	20,602	·75	61	41,325	1·49	31	29,680	1·10	19	14,931	0·55
United States ‡	91	71,469	2·38	115	150,272	1·15	72	94,387	·64	64	87,418	·65	20	39,547	·35	25	71,862	0·65
Denmark	13	6,583	·86	15	5,295	·75	9	8,281	·80	13	14,198	1·37	3	771	·07	5	4,791	0·46
France	30	34,506	1·57	34	40,420	1·81	38	33,204	·86	25	27,726	·79	13	26,981	·81	16	29,428	0·87
Germany	31	56,379	1·11	50	24,167	—	33	27,408	1·45	26	23,095	·78	21	24,512	·80	17	27,353	0·82
Holland	4	1,340	·10	23	11,550	·73	7	5,167	·20	1	801	·03	6	9,991	·39	5	21,165	0·80
Italy	26	26,881	1·77	8	3,096	·23	27	33,908	1·18	16	38,810	1·37	19	47,905	1·52	19	53,442	1·58
Japan	25	25,514	†	38	41,418	†	64†	54,136†	1·51†	42†	70,933†	1·85 †	43†	44,576†	1·12†	42†	76,212†	1·89†
Norway	61	60,648	2·47	41	44,132	2·37	29	27,068	1·04	22	23,786	·95	22	26,410	0·94	27	21,053	0·85
Spain	13	15,928	1·89	16	9,752	1·30	25	29,741	2·30	10	10,181	·82	12	15,954	1·42	10	10,424	0·94
Sweden	30	17,327	1·65	38	29,021	2·92	12	7,304	·65	16	16,627	1·33	9	10,510	·81	8	9,933	0·75
Other Countries	36	42,686	—	65	54,719	—	63	53,417	—	52	65,438	—	44	39,623	—	35	44,685	—
World's Total	542	608,235	—	635	622,805	—	505	516,711	—	422	531,545	—	298	428,240	—	280	449,700	0·74

* Figures refer to steam, motor, and sailing vessels of 100 gross tons and over totally lost, condemned, etc. The tonnage given is gross for steamers and motorships, and net for sailing ships up to and including the returns for 1919; in subsequent returns the tonnage is gross for steamers, motorships, and sailing ships

† Japanese sailing vessels not included.

‡ Excluding ships trading on the Great Lakes of America.

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FREIGHT RATES.

ESTIMATED AVERAGE RATES OF FREIGHT FOR STEAMERS IN THE OPEN MARKET, FOR VARIOUS YEARS.

OUTWARD.
From Tyne and N.E. Coast ports.

To	1920.	1921.	1922.	1924.	1925.	1927.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
River Plate	—	19 10	14 10	13 0	16 2½	13 9
Port Said	41 3	15 4	14 2¾	10 11¼	10 4	10 9½
Alexandria	—	16 11	15 2	11 5	10 0	11 10¼
Barcelona	34 0	16 8	14 8¼	12 5½	12 0	12 11¾
Oporto	46 6	16 6	15 0	13 0	10 9	10 3
Canary Islands	—	12 10	11 0	9 1½	8 10½	9 6¾
Bordeaux	38 10	8 11	7 6	5 10	5 2½	5 6¾
Bilbao	—	12 10	11 6	7 11½	7 9	8 2
Stockholm	—	10 7	7 10½	5 11½	5 6½	—
Rotterdam	17 3½	8 7	5 6½	4 3¾	3 10	3 11¾
Hamburg	10 3	6 10½	5 8½	4 5½	3 10½	3 11½
Algiers	51 5	13 2	10 11	9 4½	8 9	9 3

HOMEWARD.
To U.K. or Continent, except where otherwise stated.

From	1920.	1921.	1922.	1924.	1925.	1927.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
River Plate (Lower Ports)	118 6	35 8	26 6	23 9¼	15 5	25 0
River Plate (San Lorenzo)	125 0	45 1	27 7	25 9¾	17 9	26 9
New Orleans or Galveston *	—	7 2	3 2¾	4 2¼	3 3¼	—
Calcutta	106 10	25 0	22 1½	30 1	28 11	28 4¾
Karachi	84 6	28 4	24 10	23 8¼	22 9¼	23 3½
Rice Ports	112 0	34 2	27 10	32 8¾	29 7¾	30 9
Bombay (d.w.)	86 0	24 10	22 3	26 1¾	23 8	23 5¼
Odessa, etc. (direct)	—	—	14 4	14 10	13 0¼	14 0
Danube	60 2	25 10	16 8	19 10¾	16 8¾	17 6
Sulina (direct)	56 0	—	—	15 10½	16 10¼	—
Bilbao †	25 1¾	10 2	7 4½	6 8	6 3	6 6
Huelva	28 1	10 8	8 7	8 5½	6 5	9 6

* Net Charter. † To Tyne.

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NUMBERS OF MERCHANT VESSELS OF VARIOUS SPEEDS.†

Speed.	Number. 1910.	1922.	1924.	1925.	1926.	1928.	Speed.	Number. 1910.	1922.	1924.	1925.	1926.	1928.
25 knots and over	—	8	4	3	3	6	16½ knots	45	44	53	43	51	46
24 ,, to 25 .	—	9	7	5	6	3	16 ,,	126	131	132	147	162	170
23 ,, 24 .	—	5	8	10	9	9	15½ ,,	47	35	45	55	52	62
22 ,, 23 .	—	17	16	13	15	16	15 ,,	215	185	201	182	205	210
21 ,, 22 .	—	20	9	11	14	22	14½ ,,	85	81	102	100	100	106
20 ,, 21 .	105*	32	39	42	42	51	14 ,,	276	289	319	322	327	350
19 ,, 20 .	42	26	19	25	28	24	13½ ,,	138	170	172	169	169	183
18½ knots . .	24	18	16	23	20	19	13 ,,	462	458	461	441	451	446
18 ,, . .	60	54	55	54	50	49	12½ ,,	206	153	195	186	211	215
17½ ,, . .	48	36	34	30	22	19	12 ,,	732	790	853	839	918	882
17 ,, . .	83	88	120	121	120	122							

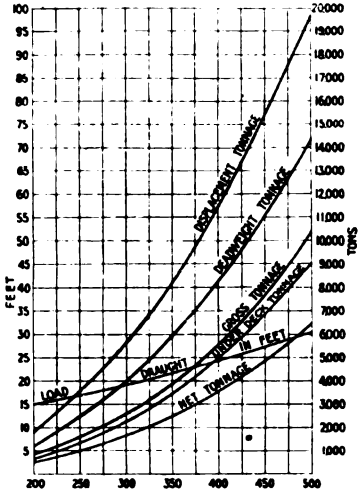
* This figure includes all merchant steamers of 20 knots and over in existence in 1910.
† The speeds used in compiling these tables are as given by the owners.

FASTEST VESSELS OF THE WORLD.†

Speed (knots).	Name.	Gross Tonnage.	Date built.	Flag.	Owners.	L.* (ft.).	B.* (ft.).	D.* (ft.).
25 and under 26	Majestic	56,551	1921	British	White Star Line	915·5	100·1	58·2
	Mauretania	30,696	1907	,,	Cunard Line	762·2	88·0	57·1
	Anglia	3,460	1920	,,	L.M.S. Railway Co.	380·5	45·2	17·2
	Hibernia	3,458	1920	,,	,,	380·6	45·2	17·2
	Cambria	3,445	1921	,,	,,	380·6	45·2	17·2
	Scotia	3,441	1921	,,	,,	380·5	45·2	17·2
24 and under 25	Versailles	1,903	1919	French	Chemins de Fer de l'État Français (Southern Railway Co.)	300·6	34·6	21·4
	Paris	1,774	1913	British	Southern Railway Co.	293·5	35·0	15·2
	Leviathan	59,957	1914	U.S.	U.S. Shipping Board	907·6	100·3	58·2
23 and under 24	France	23,769	1912	French	Cie. Gén. Transatlantique	690·1	75·6	48·5
	Maid of Orleans	2,332	1918	British	Southern Railway Co.	341·1	42·1	16·0
	Biarritz	2,331	1915	,,	,,	341·2	42·1	24·0
	Newhaven	1,656	1911	French	Chemins de Fer de l'État Français (Southern Railway Co.)	292·0	34·6	22·1
	Rouen	1,656	1912	,,		292·0	34·6	22·1
	Worthing	1,800	1928	British	Southern Railway	306·0	38·5	15·7
	Berengaria	52,226	1912	British	Cunard Line	883·6	98·3	57·1
	Aquitania	45,647	1914	,,	,,	868·7	97·0	49·7
	H. F. Alexander	8,357	1914	U.S.	Admiral Line	509·5	63·1	21·0
	Viking	1,957	1905	British	Isle of Man Stm. Packet Co.	350·4	42·0	16·1
	Engadine	1,676	1911	,,	Southern Railway Co.	316·0	41·1	15·8
	Riviera	1,675	1911	,,	,,	316·0	41·1	15·8
22 and under 23	Olympic	46,439	1911	,,	White Star Line	852·5	92·5	59·5
	Paris	34,569	1921	French	Cie. Gén. Transatlantique	735·4	85·3	59·1
	Prinses Juliana	2,908	1920	Dutch	Stoomvaart Maatschappij, "Zeeland"	350·4	42·7	23·9
	Mecklenburg	2,907	1922	,,		350·4	42·7	23·9
	Isle of Thanet	2,664	1925	British	Southern Railway Co.	329·5	45·1	17·1
	Maid of Kent	2,664	1925	,,	,,	329·5	45·1	17·1
	Manxman	2,030	1904	,,	Isle of Man Stm. Packet Co.	334·0	43·1	17·3
	Mona's Isle	1,688	1905	,,	,,	311·2	40·1	15·8
	St. Andrew	2,495	1908	,,	Fishguard and Rosslare Railways and Harbour Company	351·1	41·1	16·5
	St. David	2,457	1906	,,		350·8	41·1	16·5
	St. Patrick	2,456	1906	,,		350·8	41·1	16·5
	Snaefell	1,713	1906	,,	Isle of Man Stm. Packet Co.	315·0	39·6	15·7
	Victoria	1,689	1907	,,	Southern Railway Co.	311·0	40·1	15·8
	Wahine	4,436	1913	,,	Union S.S. Co. of New Zealand	375·0	52·2	25·6

* Registered dimensions; see note on p. 481.
† The speeds used in compiling this table are as given by the owners.

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Length of Ship in Feet

AVERAGE RELATION BETWEEN TONNAGE AND LENGTH.*

For modern steamers of the Full-Scantling Three-Island Type with 50 per cent. erections, proportions vary from $^{L}/_{D} = 12{\cdot}5$ and $^{B}/_{D} = 1{\cdot}8$ in the 200 ft. ship to $^{L}/_{D} = 13{\cdot}0$ and $^{B}/_{D} = 1{\cdot}65$ in the 500 ft. ship.

* Reprinted by permission from a paper on "Tonnage Legislation and its Application to the Measurement of Ships," by E. W. Blockridge, M.I.N.A.

GENERAL PARTICULARS OF LARGE SHIPS OF VARIOUS NATIONALITIES.

Name of Ship	AQUITANIA.	MAURETANIA.	LEVIATHAN (ex Vaterland).	BERENGARIA (ex Imperator).	MAJESTIC (ex Bismarck).
Builders	J. Brown & Co., Ltd., Clydebank	Swan, Hunter & W. Richardson, Ltd., Wallsend-on-Tyne	Blohm & Voss, Hamburg	Vulcan Co., Hamburg	Blohm & Voss, Hamburg.
Owners or Managers	Cunard Co.	Cunard Co.	U.S. Shipg. Board	Cunard Co.	White Star Line
Year when built	1914	1907	1914	1912	1921
Length over all	902 ft.	787 ft.	950 ft.	906 ft. 8½ ins.	956 ft.
Length between perps. (or moulded)	865 ft.	760 ft.	—	883 ft. 6 ins.	912 ft.
Breadth	97 ft.	88 ft.	100 ft. 3½ ins.	98 ft. 3½ ins.	100 ft.
Depth (moulded)	64 ft. 6 ins.	60 ft. 6 ins.	63 ft.	63 ft.	64 ft.
Gross Tonnage	45,647	30,696	59,957	52,226	56,551
Draught	36 ft. 2 ins.	36 ft. 2½ ins.	38 ft. 6 ins.	39 ft.	38 ft. 11½ ins.
Displacement (tons)	53,176	41,590	63,100	63,060	64,000
Number of Passengers—					
First Class	744	524	672 †	813	1000
Second Class	623	438	535	702	545
Third Class	1226	796	2392 ‡	1327	2392
Machinery Makers	John Brown & Co., Ltd.	Wallsend Slipway and Engineering Co., Ltd.	Blohm & Voss, Hamburg	Vulcan Co., Hamburg	Blohm & Voss, Hamburg
Type of Engines	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws	Turbines	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws
Number of Cranks	—	—	—	—	—
Diam. of Cylinders	—	—	—	—	—
Stroke of Pistons	—	—	—	—	—
Revs. per Minute	180	180	180–190	180	180
Total Indicated or Shaft H.P.	60,000	75,000	—	76,250	66,000
No. and Type of Boilers	21 Cylindrical (double ended)	25 Cylindrical (23 double-ended, 2 single-ended)	46 Water Tube	46 Water Tube	48 Water Tube
No. of Furnaces	168 (oil-fired)	192 (oil-fired)	138 (now fitted for oil burning)	46 (oil-fired)	48 (oil-fired)
Steam Pressure (lb. per sq. in.)	195	195	235	228	260
Total Heating Surface (sq. ft.)	138,595	167,520	210,440	203,000	220,000
Total Grate Area (sq. ft.)	3541	4048	3843	3763	4013
System of Draught	Howden's	Howden's	Howden's	Howden's	Forced
Speed on Service (knots)	23	25·5 *	23	23	25

* NOTE.—This figure is the mean speed attained for 27 consecutive runs across the North Atlantic in one year covering a total distance of 77,500 nautical miles. The highest mean speed from Queenstown to New York was 26·25 knots.

† 80 Berths for Servants and 110 Pullman Berths in addition. ‡ Including 1542 Fourth Class Passengers.

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PARTICULARS OF FASTEST VOYAGES ON PRINCIPAL PASSENGER SERVICES.

Name of Vessel.	Owners.	Date of Voyage.	Ports between which Voyage was made.	Total distance steamed. (Sea miles.)	Time taken.	Average speed (Knots).	Best day's run (Knots).	Remarks.
Mauretania . .	Cunard Steam Ship Co., Ltd.	Sept., 1910	Liverpool and New York	2,780*	4 days, 10 hours, 41 mins.	26·06	—	* The distance given is between Daunts Rock and Sandy Hook Lightship, the points between which the time was taken. On a voyage in January, 1911, the Mauretania attained a speed of 27·04 knots for one day, and the best day's run on the same voyage was 676 knots. § The distance given is between Ambrose Channel Light Vessel and Cherbourg Breakwater. † Record sea transit to Bombay, but not record speed as vessel did not have to deviate to Marseilles. ‡ Now owned by the London and North Eastern Railway.
,,	,, ,,	Aug., 1924	New York and Cherbourg	3,198§	5 days, 1 hour, 49 mins.	26·25	—	
,,	,, ,,	Sept., 1928	Cherbourg and New York	3,096§	5 d. 2 h. 34 mins.	25·26	645	
Majestic . . .	White Star Line	Sept., 1923	New York and Southampton *via* Cherbourg	3,104 (ocean passage)	5 days, 5 hours, 21 mins.	24·76	613	
Empress of France	Canadian Pacific Steamships, Ltd.	July 17–24, 1924	Southampton and Quebec	2,640	5 days, 8 hours, 51 mins.	20·49	—	
China	Peninsular and Oriental Steam Navigation Co.	Sept. 26 to Oct. 14, 1919	London and Bombay	6,258	17 days, 20 hours.†	15·7	—	
Orbita	Pacific Steam Navigation Co.	May 5 to July 18, 1927	Liverpool, Valparaiso, Liverpool, *via* Panama Canal	18,443	73 days, 18 hours (actual steaming 55 d. 5 h.)	14·5	376	
Paris	Southern Railway and French State Railway	July 14, 1913	Newhaven and Dieppe	65	2 hours, 35 mins., 37 secs.	25·07	—	
Maid of Orleans .	Southern Railway	April 25 & 28, 1922	Dover and Calais	20	50 mins.	24·0	—	
St. George . .	Gt. Western Railway ‡	July 6, 1910	Fishguard and Rosslare	54	2 hours, 28 mins.	21·9	—	
Lorina	Southern Railway	Sept. 4, 1920	Jersey and Southampton	130	6 hours, 34 mins.	19·8	—	

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"LAID-UP" STEAM TONNAGE OF PRINCIPAL MARITIME COUNTRIES.

	Jan. 1st, 1924.	Jan. 1st, 1925.	Jan. 1st, 1926.	July 1st, 1926.	Jan. 1st, 1927.	July 1st, 1927.	Jan. 1st, 1928.	July 1st, 1928.
	Gross tnage.	Gross tnage.	Gross tnage.	Gross tnge.	Gross tnage.	Gross tnge.	Gross tnage.	Grosstnge.
Gt. Brit. & Ireland	909,000	705,000	613,000	1,273,000	529,000	662,000	575,000	665,000
Australia	85,000*	166,000	51,000	125,000	71,000	29,000	†	†
United States :—								
Shipping Board	3,564,000	3,664,000	3,518,000	3,225,000	2,336,000	2,550,000	2,405,000	2,558,000
Ship. Bd. Tankers	163,000	125,000	134,000	91,000	56,000	11,000	†	†
Govt. owned, other than U.S. S. Bd.	3,000	17,000	16,000	26,000	27,000	22,000	†	†
Privately owned	541,000	417,000	458,000	415,000	457,000	321,000	726,000	587,000
U.S. total	4,271,000	4,223,000	4,120,000	3,757,000	2,876,000	2,904,000	3,131,000	3,145,000
Belgium	86,000	26,000	21,000	28,000	14,000§	†	†	†
Denmark	13,000	—	63,000	75,000	20,000	†	†	†
France	450,000	311,000	134,000	92,000	118,000	91,000	177,000	163,000
Greece	122,000	24,000	99,000	67,000	106,000§	79,000	77,000	91,000
Holland	235,000	65,000	109,000	64,000	3,000	3,000	16,000	†
Italy	427,000	225,000*	225,000	251,000	110,000	83,000‖	312,000	423,000
Japan	29,000	25,000	35,000	25,000	48,000	24,000	49,000	14,000
Norway	50,000	25,000	22,000	89,000	37,000§	24,000	136,000	62,000
Spain	128,000	60,000	44,000	73,000	35,000	33,000	52,000	35,000
Sweden	—	20,000	30,000	13,000	9,000	†	28,000	2,000
Other Countries ‡	83,000	103,000	279,000	154,000	100,000	77,000	†	†
World's total	6,888,000	5,978,000	5,845,000	6,086,000	4,076,000	4,000,000¶	3,978,000	3,935,000

* Estimated. † No data available. ‡ Mainly belonging to countries shown above.
§ Figures at October, 1926, available only. ‖ Figures at May 1st, 1927, available only. ¶ Partly estimated.

PAY IN THE MERCHANT SERVICE.—Monthly Rates.

*Foreign-going Cargo Steamers.**

Rating.	1914.	1924.†	1926. ‡	1927.§
	£ s. £ s.	£ s. £ s.	£ s. £ s.	£ s. £ s.
First Mates	12 5 to 14 5	17 10 to 26 10	16 0 to 25 0	16 0 to 25 0
Second Mates	9 5 „ 12 15	15 0 „ 18 10	13 10 „ 17 0	13 10 „ 17 0
Third Mates	7 10 „ 10 10	13 0 „ 14 0	11 10 „ 12 10	11 10 „ 12 10
Chief Engineers	16 15 „ 24 0	21 10 „ 34 10	20 0 „ 33 0	20 0 „ 33 0
Second Engineers	12 5 „ 14 15	17 10 „ 26 10	16 0 „ 25 0	16 0 „ 25 0
Third Engineers.	8 15 „ 11 15	15 0 „ 18 10	13 10 „ 17 0	13 10 „ 17 0
Carpenters	7 0 „ 7 10	12 10 „ 16 10	— —	11 10 to 15 10
Boatswains	6 5 „ 6 10	11 10 (Fixed rate.)	10 10 (Fixed rate.)	10 10 (Fixed rate.)
Firemen	5 10 „ 6 0	10 10 „	9 10 „	9 10
Able Seamen	5 0 „ 5 10	10 0 „	9 0 „	9 0

1928—No alteration in Monthly Rates.

* On Oil-Tank Vessels, the 1924, 1926 and 1927 rates are supplemented by the following percentage additions :—

Chief Engineers	12½ per cent.
First Mates and Second Engineers	10 „
Other Mates and Engineers	7½ „

On Motor Vessels there is a special National Standard Scale of Pay for Engineer Officers substantially higher than on steam-driven vessels.

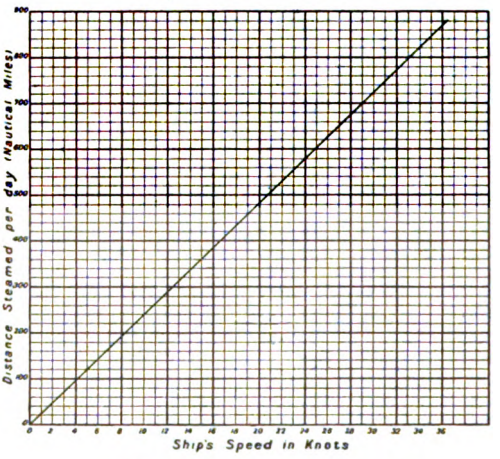
† The 1924 figures are the National Maritime Board standard rates of pay, effective from September 5, 1924, and based, in the case of Navigating and Engineer Officers, on tonnage and seniority.

‡ National Maritime Board standard rates effective from August 1st, 1925.

On Passenger Liners, Navigating and Engineer Officers, as a rule, receive now, as before the War, wages from 10 to 25 per cent. higher than the Standard Cargo-Vessel rates.

§ National Maritime Board rates revised to January 1st 1927.

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DISTANCE STEAMED IN ONE DAY
BY SHIPS OF DIFFERENT SPEEDS.

NUMBERS OF MERCHANT VESSELS USING THE VARIOUS TYPES OF PROPULSION.*

(Excluding vessels of less than 100 tons gross.) As at June, 1928.

Country.	Oil Engines.	Steam Turbines.	Steam Reciprocating Engines.	Auxiliary Steam Engines.	Auxiliary Oil Engines.	Sails.	Totals.
Great Britain and Ireland .	351	331	7,054	1	73	394	8,204
British Dominions . . .	117	15	1,810	4	84	449	2,479
British Empire	468	346	8,864	5	157	843	10,683
United States	196	687	2,087	—	35	754	3,759
Belgium	9	11	209	—	2	3	233
Denmark	71	20	490	2	44	86	718
France	28	65	1,362	1	26	200	1,682
Germany	146	82	1,619	4	202	27	2,080
Greece	5	—	502	—	8	—	515
Holland	194	62	896	—	118	20	1,290
Italy	76	57	944	3	62	287	1,329
Japan	91	44	1,718	74	121	—	2,048
Norway	218	12	1,456	18	61	22	1,787
Spain	28	14	689	3	55	95	884
Sweden	122	10	1,012	1	94	144	1,383
Other Countries	149	6	2,535	3	140	540	3,373
Total . . .	1,808	1,418	24,922	114	1,125	3,021	32,408

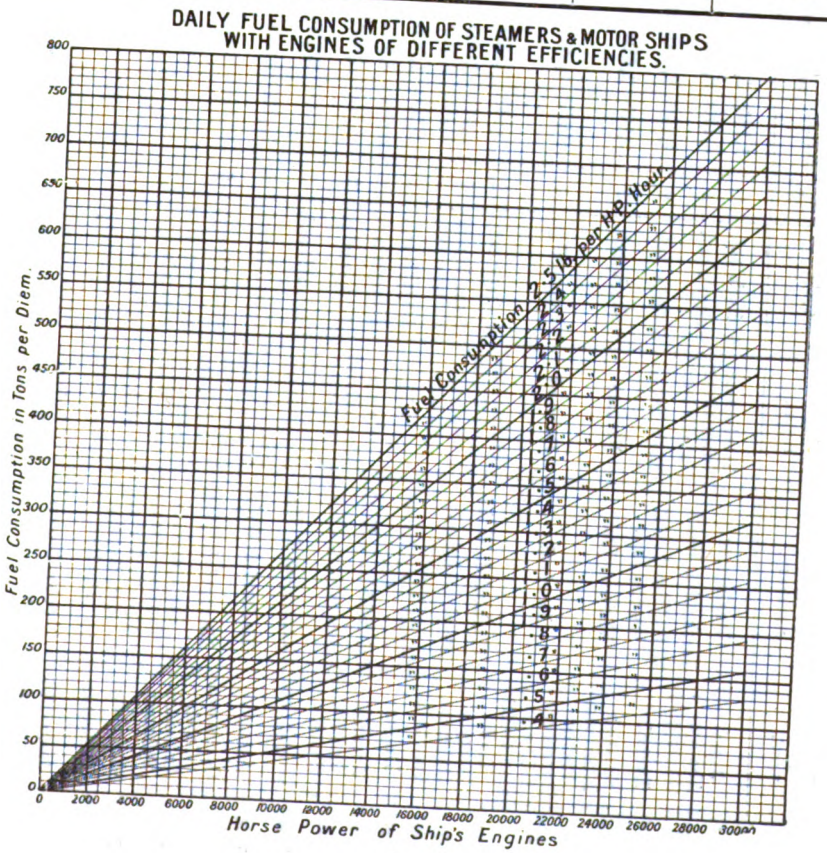
* Excluding American Great Lake vessels and Japanese sailing vessels.

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COMPARISON OF RUNNING COSTS OF STEAM AND MOTOR SHIPS.

DEADWEIGHT CAPACITY, 8,000 TONS. SPEED, 10½ KNOTS. VOYAGE, 30 DAYS.

Type of Machinery	S.S. Diesel 2,200 B.H.P.	S.S. Geared Turbines. 2,200 S.H.P.	S.S. Recip. 2,500 I.H.P.	S.S. Recip. Bauer Wach 2,500 I.H.P.
Fuel	Oil.	Coal.	Coal.	Coal.
Fuel 163/h.p. hour	0·4	1·56	1·65	1·25
,, tons day	9·4	36·7	44·2	33½
,, voyage	282	1,101	1,326	1,005
Price, fuel/ton	£3 5*s.*	£1 5*s.*	£1 5*s.*	£1 5*s.*
Cost/voyage	£916 10*s.*	£1,376 5*s.*	£1,657 10*s.*	£1,256 5*s.*
Lub. oil, galls./day	14	6	4	6
,, cost/gall.	2*s.* 2*d.*	2*s.* 2*d.*	1*s.* 9*d.*	2*s.* 2*d.*
,, voyage	£45	£19 10*s.*	£10 10*s.*	£19 10*s.*
E.R. staff	8	21	21	21
Wages/voyage	£151	£228 10*s.*	£228 10*s.*	£228 10*s.*
Provision/voyage	£30	£78 15*s.*	£78 15*s.*	£78 15*s.*
Wages, fuel, lub. oil, and provisions/voyage	£1,132 10*s.*	£1,703	£1,975 5*s.*	£1,583
Running costs—Ratio	1	1·5	1·74	1·4
Comparative cost—Fuel winches/harbour	£28 10*s.* (electric)	£96 5*s.* (steam)	£96 5*s.* (steam)	£96 5*s.* (steam)



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IMPORTANT MOTORSHIPS IN SERVICE AND BUILDING, GIVING PARTICULARS OF THEIR MACHINERY.

Date.	Name of vessel.	Makers of machinery.	Type of engine.	Cycle.	No. of eng.	Total B.H.P.	I.H.P. per engine.	B.H.P. per engine.	No. of cyl. per eng.	B.H.P. per cyl.	Diameter of cyl. in ins.	Stroke in ins.	Ratio stroke to bore.	Revs. per min.	Piston speed. Ft. per min.	M.P. on B.H.P. basis.	M.P. on I.H.P. Basis.	Consumption of fuel in lbs. per sq. in. piston area.
1912*	Juno	Werkspoor	Werkspoor	4 single act.	1	1,100	1,460	1,100	6	183	22	39⅜	1·79	125	820	84·0	111·0	0·219
1918*	Aba (ex-Glenapp)	Harland & Wolff	Burmeister and Wain	4 single act.	2	5,250	3,200	2,625	8	328	29½	43 A/16	1·46	115	830	76·0	93·0	0·202
1921*	Domala	N.B. Diesel Eng. Works, Ltd.	N.B. Diesel	4 single act.	2	4,000	2,500	2,000	8	250	26⅜	47	1·77	96	752	79·5†	99·5	0·191
1922*	Scottish Musician	Vickers, Ltd.	Vickers	4 single act.	2	2,500	1,620	1,250	6	208	24½	39	1·59	118	767	76·0	99·0	0·185‡
1922*	Pacific Commerce *ex* Dominion Miller	Doxford	Doxford	2 opposed p.	1	2,700	3,000	2,700	4	675	22⅛	91¼ comb'd.	4·0	77	585	93·0	103·0	0·362‡
1922*	Loch Katrine	Harland & Wolff	Burmeister and Wain	4 single act.	2	5,250	3,200	2,625	8	328	29⅛	45¼	1·55	115	865	75·0	91·5	0·206
1923*	Dalgoma	Stephen & Sons	Sulzer	2 single act.	2	3,200	2,200	1,600	4	400	26¾	43 A/16	1·62	85	613	76·5	105·0	0·312
1923*	Camranh	Sulzer	Sulzer	2 single act.	2	3,400	2,400	1,700	4	425	27	47	1·62	85	612	81·0	115·0	0·333
1924*	Dolius	Scotts' Ship. & Eng. Co.	Still	2 double act.	2	2,500	1,500	1,250	4	312	22	36	1·64	120	720	70 oil 6 steam	84 oil 7·2 st'm	0·28§
1924*	Aorangi	Fairfield S. & E. Co.	Sulzer	2 single act.	4	13,000	4,400	3,250	6	542	27½	99	1·42	135	880	68·5	93·0	0·382‖
1924*	British Aviator	Palmers S. B. & I. Co.	Camellaird-Fullagar	2 opposed p.	1	3,000	4,000	3,000	6	500	28	72	1·56	86	516	77·0	102·0	0·258
1925*	Gripsholm	Burmeister & Wain	Burmeister and Wain	4 double act.	2	13,500	8,800	6,750	6	1,125	33	59	1·75	125	1,250	77·0	99·5	0·3 †
1925*	Asturias	Harland & Wolff	Burmeister and Wain	4 double act.	2	16,500	10,000	8,250	8	1,031	33	59	1·79	125	1,229	69	83	0·3
1926*	Carnarvon Castle	Harland & Wolff	Burmeister and Wain	4 double act.	2	13,000	8,675	6,500	8	812	33	59	1·79	105	1,032	61	81	0·3
1926*	Saturnia Vulcania	Stabilimento Tecnico Triestino	Burmeister and Wain	4 db. act. with superchargers	2	20,000	13,350	10,000	8	1,250	33	59	1·79	125	1,229	83	111	—†
1927*	Augustus	M.A.N. & Cant. Off. Savoia	M.A.N.	2 double act.	4	25,000	—	6,250	6	1,040	27½	47¼	1·72	120	950	—	—	—‖
1927*	Bermuda	Doxford	Doxford	2 opposed p.	4	11,200	—	2,800	4	700	23⅝	71 comb'd.	3·0	110	650	82	—	—‖
1928	Rangitiki	John Brown	Sulzer	2 single act.	2	10,000	—	5,000	4	1,000	36½	63	1·72	90	945	—	—	—
1928	Poelau Laut	Sulzer Bros.	Sulzer	2 single act.	1	7,040	8,600	7,040	8	880	32½	56¾	1·76	100	945	76	—	—
1928*	Kungsholm	Burmeister & Wain	Burmeister and Wain	4 double act.	2	15,000	9,000	7,500	8	938	33	59	1·79	100	985	—	—	—†

* In operation at sea. † No compressor on engine. ‡ Airless injection. § Oil and steam. ‖ Quadruple screw.

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IMPORTANT DATES IN THE DEVELOPMENT OF MARINE PROPELLING MACHINERY.

—	Approximate Date of Introduction in the United Kingdom.			
	Merchant.		Naval.	
Compound engines	—	1860	—	1865
Triple-expansion engines	—	1880	—	1885
Quadruple-expansion engines	—	1890	Not fitted	—
Cylindrical boilers	—	1862	—	1869
Water-tube boilers	Cross-channel	1911	Destroyers	1893
	Ocean liners	1914	Battleships	1897
Direct turbines	Cross-channel	1901	Destroyers	1898
	Ocean liners	1905	Light cruisers	1904
			Battleships	1906
Combination engines and turbines	Intermediate liner	1908	(For cruising only)	1902
Combination machinery on common line shafting (Bauer-Wach system)	Intermediate liner and cargo steamers	1926	—	—
Geared turbines	Single-reduction	1911	Single-reduction	1913
	Double-reduction	1916	Not fitted	—
High pressure turbines	Single-reduction	1926	Destroyers	1926
Electric propulsion	First attempts	1904	Not fitted	—
	Modern plant	1912	—	—
Oil fuel burning	First attempts	1870	Coal and oil—	
			Destroyers	1902
			Battleships	1904
	Modern plant	1892	Oil alone—	
			Destroyers	1910
			Battleships	1913
Heavy oil engines	First attempts	1904	Tender	1914
	Modern plant	1910	Submarines	1908
	Double-acting	1924	Submarine depôt ship	1928
	Supercharging	1925		

MARINE ENGINES UNDER CONSTRUCTION IN THE WORLD *

(Recorded by Lloyd's Register of Shipping as at the end of December, 1927).

Country in which building.	Steam Engines.				Oil Engines.		Total.	
	Reciprocating.		Turbines.					
	No.	I.H.P.	No.	S.H.P.	No.	I.H.P.	No.	H.P.
Gt. Britain & Ireland	224	405,984	18	202,500	90	373,341	332	981,825
Denmark	1	1,250	—	—	31	131,260	32	132,510
France	7	10,580	—	—	7	31,300	14	41,880
Germany	32	54,800	Not available		54	241,300	86	296,100*
Holland	20	26,080	4	22,800	20	67,850	44	116,730
Italy	4	4,000	2	43,000	29	161,050	45	208,950
Japan	7	15,880	1	3,000	4	7,650	12	26,530
Norway	7	4,900	—	—	1	3,100	8	8,000
Russia	9	8,550	—	—	7	20,020	16	28,570
Spain	2	1,900	4	24,400	—	—	6	26,300
Sweden	4	2,600	—	—	77	64 265	81	66,865
Switzerland	—	—	2	6,000	14	111,300	16	117,300
United States	4	9,000	3	42,000	7	17,860	14	68,860
Other Countries	6	10,450	—	—	1	3,660	7	14,110
Total	327	556,874	34	343,700*	352	1,233,956	713	2,134,530*

* Excluding turbines building in Germany. The horse-power is compiled from figures furnished by the engine makers.

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PROGRESS IN MARINE MACHINERY.

Type of vessel.	Year.	Dimensions.		Performance.		Engines.						Boilers.					Total weight of Machinery, "Steam Up" (tons).	H.P. per ton of Machinery.	Coal Consumption (lbs. per H.P. hour).
		Length (feet).	Beam (feet).	Speed (knots).	Horse-power.	No. of Propellers.	Type of Machinery.*	No. of Cylinders (per shaft).	Propeller revs. per min.	Piston speed (f.p.m.)	Referred M.P. (lb. per sq. in.)	No. and Type.†	Working press. (lb. per sq. in.)	System of Draught.‡	Heating Surface per H.P. (sq. ft.)	H.P. per sq. ft. of grate.			
Atlantic liners .	1881	500	50	18·0	10,680	1	C	3	64	770	29·1	–C	100	N	3·3	8·57	1,860	5·74	—
	1888	528	63	20·1	18,500	2	TE	3	86	860	35·3	9 DC	150	CS	2·75	14·3	2,516	7·4	1·7
	1893	600	65	22·0	30,000	2	TE	5	81	930	35	12 DC	165	N	2·73	11·4	4,935	6·1	1·6
	1899	685	68	20·7	27,000	2	TE	4	78	936	35	15 DC	192	AD	2·77	13·75	4,414	6·1	—
	1907	760	87	26·0	72,500	4	T	—	180	—	—	23 DC & 2 C	195	H	2·19	17·9	9,936	7·3	1·4
	1914	865	96	23·5	60,000	4	T	—	180	—	—	21 DC	195	H	2·31	16·9	9,302	6·5	1·3
	1921	912	100	23·5	66,000	4	T	—	180	—	—	48 W	260	FD	3·33	16·4	—	—	—
	1928	1000	—	—	—	4	ED	—	—	—	—	—	—	—	—	—	—	—	—
Intermediate Ocean liners .	1880	400	45	12·5	3,000•	1	C	2	61	671	20·5	2 C	90	N	3·1	7·6	685	4·35	2·4
	1892	470	53	12·5	3,500•	2	TE	3	80	640	32·0	2 DC & 1 C	170	N	3·3	10·0	795	4·4	1·9
	1911	520	64	14·5	7,500•	2	QE	4	82	738	37·0	5 DC	210	N	3·25	11·75	1,750	4·25	1·6
	1914	550	66	16·5	11,000§	2	GT	—	133	1,650P	—	5 DC	210	H	2·5	17·5	1,800	6·1	1·4
	1920	550	66	17·0	11,000§	2	GT	—	85	(3,200)Q (2,000)Q	—	5 Wz	250	OD	2·25	—	1,210	9·1	0·9a
Cargo steamers .	1877	314	35	11·25	775•	1	FC	—	52	450	23	1 OC	70	N	4·46	7·6	200	3·87	2·5
	1885	320	38	12·25	1,650•	1	TE	—	70	560	31·5	2 C	150	N	2·82	10·4	340	4·85	1·95
	1911	440	52	13·25	4,200•	1	TE	—	73	750	35	2 C	190	FD	2·8	16·25	900	4·67	1·65
	1914	450	56	14·25	5,000§	1	GT	—	102	1,350P	—	2 C	195	H	2·30	20·0	930	6·45	1·45
	1920	503	63	14·25	7,000§	2	DT	—	80	(3,500)Q (1,800)Q	—	3 FCz	200	OD	2·25	—	1,100	6·35	0·85a
Cross-Channel Steamers . .	1890	300	35	18·00	4,400•	2	TE	3	130	780	30·75	5 C	160	N	2·6	12·25	590	7·45	2·25
	1898	315	37	19·75	5,520•	2	TE	4	165	910	43·0	4 C	180	FD	1·95	17·5	610	9·62	2·1
	1904	330	42	19·5	5,500§	3	T	—	550	550P	—	2DC&1C	150	FD	1·9	16·5	590	9·3	1·8
	1910	316	41	21·5	8,500§	3	T	—	625	625P	—	7 W	190	FD	1·95	15·0	735	11·6	1·7
	1920	302	36	23·5	12,300§	2	GT	—	435	(2,600)Q (1,800)Q	—	8 W	195	FD	2·00	22·0	1,055	11·65	1·5
Motor ships . .	1925	329	45	22·25	—	2	GT	—	270	—	—	5 W	200	FD	—	—	—	—	—
	1909	210	38	8·5	490•	1	4 S	6	140	550	99y	Steam auxilliaries			—	—	91	4·3t	0·6a
	1910	260	43	10·5	1,460•	1	4 S	6	125	820	111y	,, ,,			—	—	220	5·0t	0·5a
	1912	380	53	11·0	2,500•	2	4 S	8	140	670	89·8y	Electric ,,			—	—	390	4·8t	0·47a
	1914	425	55	11·25	3,100•	2	4 S	6	125	785	89·5y	,, ,,			—	—	475	4·9t	0·45a
	1916	450	57	12·0	4,000•	2	4 S	6	100	725	91·0y	,, ,,			—	—	600	5·0t	0·45a
	1922	502	62	13·5	6,400•	2	4 S	8	115	865	91·5y	,, ,,			—	—	940	5·1t	0·45a
	1924	580	72	18·5	17,500•	4	2 S	6	135	880	93·0y	Steam ,,			—	—	2,350	—	0·48a
	1926	630	79	17·0	20,000	2	4 D	8	125	1,229	83·0y	Electric ,,			—	—	5,000	5·0	0·48a
	1927	711	82½	20·0	25,000	4	2 D	6	120	950	—	,, ,,			—	—	—	—	—

• C = Vertical Compound; F.C. = Tandem Compound with flywheel; TE = triple expansion; QE = quadruple expansion; T = turbines; GT = geared turbines; DT = double-reduction geared turbines; ED = electric drive; 4S = 4-cycle single acting motors; 4D = 4-cycle double-acting motors; 2S = 2-cycle single acting motors.

† C = cylindrical; OC = oval ends and cylindrical middle portion; DC = double-ended cylindrical; FC = oil-fired cylindrical; W = water-tube (oil-fired).

‡ N = natural draught; AD = assisted draught; CS = closed stokehold; FD = forced draught; H = Howden's forced draught; OD = oil-burning with forced draught.

• I.H.P. § S.H.P. t B.H.P. P turbine revs. per min. Q turbine revs. per min., H.P. and L.P. respectively.

z with superheaters. a Oil. y Mean Pressures for motorships are on I.H.P. basis.

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PRODUCTION OF CRUDE OIL IN VARIOUS REGIONS.

Country.	Production of Crude Petroleum in—										
	1880.	1890.	1900.	1910.	1920.	1922.	1923.	1924.	1925.	1926.	1926.
	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	% of Total.
United States .	26,286,123	45,823,572	63,620,529	209,557,248	443,402,000	557,531,000	732,407,000	714,000,000	763,743,000	775,000,000	70·7
Mexico . . .	—	—	—	3,634,080	163,540,000	182,278,000	149,585,000	139,587,000	115,515,000	90,000,000	8·2
Trinidad . .	—	—	—	142,857	2,083,027	2,445,000	3,051,000	4,284,000	4,564,000	4,971,000	0·5
Argentina . .	—	—	—	20,753	1,665,989	3,018,000	3,400,000	3,844,000	5,818,000	6,500,000	0·6
Peru	—	—	274,800	1,330,105	2,816,649	5,314,000	5,699,000	7,812,000	9,164,000	10,782,000	1·0
Venezuela . .	—	—	—	—	—	2,201,000	4,201,000	9,500,000	19,687,000	37,226,000	3·4
Dutch E. Indies	—	—	2,253,355	11,030,620	17,529,210	16,720,000	19,868,000	21,000,000	21,422,000	22,200,000	2·0
Egypt . . .	—	—	—	—	1,042,000	1,188,000	1,054,000	1,107,000	1,226,000	1,161,000	0·1
India . . .	—	118,065	1,078,264	6,137,990	7,500,000	8,529,000	8,320.000	8,150,000	8,000,000	8,728,000	0·8
Japan * . . .	25,497	51,420	866,814	1,930,661	2,139,777	2,055,000	1,805,000	1,600,000	2,000,000	1,900,000	0·2
Persia . . .	—	—	—	—	—	22,247,000	28,326,000	31,845,000	35,038,000	35,460,000	3·2
Sarawak . .	—	—	—	—	—	2,849,000	3,940,000	4,500,000	4,257,000	4,300,000	0·4
Poland . . .	229,120	659,012	2,346,505	12,673,688	5,606,116	5,227,000	5,373,000	5,710,000	5,960,000	5,835,000	0·5
Roumania . .	114,321	383,227	1,628,535	9,723,806	7,435,844	9,843,000	10,867,000	13,296,000	16,466,000	23,299,000	2·1
Russia . . .	3,001,200	28,691,218	75,779,417	70,336,574	25,429,600	35,692,000	39,156,000	45,162,000	52,448,000	61,000,000	5·5
Columbia . .	—	—	—	—	—	—	—	—	581,000	6,446,000	0·6
Other Countries	761,345	906,324	1,283,897	1,419,247	14,654,288†	1,578,000	1,539,000	1,742,000	1,407,000	1,800,000	0·2
Total . .	30,017,606	76,632,838	149,132,116	327,937,629	694,854,000	858,715,000	1018,591,000	1013,139,000	1067,566,000	1096,608,000	—
Percentages of increase . .	418 over 1870	155·4 over 1880	94·5 over 1890	119·8 over 1900	111 9 over 1910	12·2 over 1921	18·5 over 1922	·5 % *decrease* on 1923	4·7 over 1924	2·7 over 1925	

NOTE.—The figures in the above table may be taken as approximately accurate, allowing for the more or less exact methods of various tabulators, *e.g.* in the capacity of the "barrel." The standard usually taken is 42 U.S. gallons to the barrel. The later figures for Russia, and in one or two other instances where authoritative returns are not published, have had to be partly estimated.

The order of the countries, according to production, is:—United States, Mexico, Russia, Venezuela, Persia, Rumania, Dutch East Indies, Peru, India, Argentina, Colombia, Poland, Trinidad, Sarawak, Japan, Egypt.

* The figures for Japan include Formosa.

† Includes Persia.

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PRODUCTION OF COAL IN PRINCIPAL COUNTRIES.

(Thousands of Tons, *i.e.* 000's omitted.)

Country.	1890.	1900.	1910.	1920.	1922.	1923.	1924.	1925.	1926.	1927.
Great Britain and Ireland. .	180,639	225,181	264,433	229,295	250,808	278,141	269,134	246,671	146,502	297,453
British Dominions	9,027	18,808	42,183	58,661	55,969	60,626	58,224	48,651*	62,517†	58,759†
British Empire	189,656	243,989	306,631	288,193	305,576	336,636	325,696	295,322	209,019	356,212
United States	140,846	240,748	447,835	587,774	425,876	572,219	511,811	514,605	592,089	536,717
Austria-Hungary	9,770	12,175	14,891	4,399	6,354	7,583	7,088	6,226	— ‡	— ‡
Belgium	20,045	23,094	23,540	22,036	20,874	22,561	22,992	22,767	25,318	27,132
China	—	—	12,982	19,800*	19,800*	19,800*	19,800*	10,000*	19,680	— ‡
Czecho-Slovakia	—	—	—	11,201	10,300	12,153	14,133	12,554	13,950	14,349
France	25,672	32,879	37,746	34,126	42,473	46,984	44,244	47,275	50,599	50,951
Germany	69,132	107,569	150,421	129,313	129,675	61,245	116,958	130,632	156,433§	167,193§
Holland	107	315	1,272	5,252	4,528	5,251	5,977	6,740	8,701	9,077
Japan	2,598	7,371	15,434	28,784	27,266	28,492	29,635	28,758	33,119	30,976
Russia	5,920	15,902	24,537	7,522	8,915	12,044	13,592	17,361	21,865	30,504
Other Countries	2,789	4,049	7,034	8,254	21,985	39,755	35,244	35,209	44,450†	40,050
World total . .	466,535	688,091	1,042,307	1,146,417	1,024,803	1,166,854	1,148,827	1,127,449	1,175,223†	1,263,161†

* Estimated. † Partly estimated. ‡ Not available. § Including Saar District.

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COAL PRODUCTION AND DISTRIBUTION OF THE UNITED KINGDOM.

Year.	Total production. (Thousand tons.)	Home consumption. (Thousand tons.)	Exported * (Thousand tons.)	Bunkers. (Foreign trade.) (Thousand tons.)
1903	230,334	168,584	44,950	16,800
1904	232,428	168,981	46,256	17,191
1905	236,129	171,256	47,477	17,396
1906	251,068	176,878	55,600	18,590
1907	267,831	185,602	63,610	18,619
1908	261,529	179,508	62,547	19,474
1909	263,774	180,983	63,077	19,714
1910	264,433	182,822	62,085	19,526
1911	271,892	188,029	64,599	19,264
1912	260,416	177,681	64,444	18,291
1913	287,412	192,980	73,400	21,032
1914	265,430	187,854	59,040	18,536
1915	253,179	196,013	43,535	13,631
1916	255,846	204,506	38,352	12,988
1917	248,041	202,817	34,996	10,228
1918	226,557	186,048	31,753	8,756
1919	229,037	181,766	35,250	12,021
1920	229,295	190,523	24,932	13,840
1921	164,344	128,757	24,661	10,926
1922	250,808	168,350	64,198	18,259
1923	278,141	180,533	79,450	18,158
1924	269,134	189,793	61,651	17,689
1925	246,671	179,417	50,817	16,437
1926	126,280	88,780 †	30,000	7,500
1927	251,232	185,655	48,741	16,836

* Excluding coke and manufactured fuel.

† Owing to the extended coal stoppage which prevailed during seven months of 1926, over 21,000,000 tons of coal were imported into the U.K. from abroad. The total home consumption for 1926, including importations, and also including coal worked during the stoppage for which no figures are available, is estimated at 128,000,000 to 133,000,000 tons.

COAL PRODUCTION AND DISTRIBUTION OF THE UNITED STATES.

Year.	Total production.* (Thousand tons.)	Home consumption. (Thousand tons.)	Exported. (Thousand tons.)	Bunkers. (Foreign trade.) (Thousand tons.)
1903	319,068	—†	8,312	—†
1904	314,122	—†	8,573	—†
1905	350,645	—†	9,189	—†
1906	369,783	354,736	9,922	5,125
1907	428,896	409,989	13,153	5,754
1908	371,288	353,411	11,853	6,024
1909	411,442	392,786	12,537	6,119
1910	447,854	427,602	13,806	6,446
1911	443,189	419,089	17,433	6,667
1912	477,202	451,713	18,149	7,340
1913	508,893	479,051	22,141	7,701
1914	458,505	433,607	17,632	7,266
1915	474,660	446,884	20,305	7,471
1916	526,873	495,904	23,143	7,826
1917	581,609	548,077	26,649	6,883
1918	605,546	575,622	24,392	5,532
1919	494,600	464,808	22,402	7,343
1920	577,738	529,161	39,415	9,362
1921	452,139	419,762	24,829	7,548
1922	425,849	408,280	13,449	4,120
1923	572,182	543,935	23,700	4,547
1924	512,048	489,208	18,851	3,989
1925	514,605	491,832	18,429	4,344
1926	592,089	549,210	35,972	6,907
1927	536,718	512,871	19,771	4,076

* Figures given include both anthracite and bituminous coal.

† Figures not available.

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"EXPORTS" OF NEW SHIPS FROM THE UNITED KINGDOM.

SHIPS NOT REGISTERED AS BRITISH, WITH THEIR MACHINERY.

Year.	War Vessels (including Machinery and Armament).	Steam Ships (other than War Vessels).		Sailing Ships (other than War Vessels) including Boats.	Total of New Ships.
		Hulls and Fittings.	Machinery.		
	£	£	£	£	£
1903	74,480	2,798,737	1,222,108	188,504	4,283,829
1904	388,600	2,570,835	1,164,779	330,937	4,455,151
1905	50,000	3,693,422	1,516,183	171,693	5,431,298
1906	2,800,000	3,973,873	1,668,592	201,706	8,644,171
1907	554,700	6,586,449	2,550,702	326,262	10,018,113
1908	1,879,994	5,902,428	2,505,280	189,773	10,567,475
1909	247,000	3,698,556	1,819,618	161,940	5,927,114
1910	4,894,500	2,553,427	1,209,119	113,158	8,770,204
1911	25,000	3,745,349	1,632,402	259,564	5,663,115
1912	765,000	4,243,308	1,750,351	268,503	7,027,162
1913	2,617,100	5,867,179	2,336,509	205,742	11,026,530
1914	308,385	4,716,226	1,784,900	123,043	6,932,554
1915	—	1,170,606	472,597	49,548	1,692,661
1916	20,000	754,372	481,703	34,510	1,290,585
1917	—	706,084	347,354	33,869	1,087,307
1918	—	778,525	229,292	39,517	1,047,334
1919	—	1,703,961	505,652	118,718	2,328,331
1920	—	26,280,243		295,771	26,576,016
1921	—	29,523,833		470,615	29,994,448
1922	—	30,222,080		220,435	30,442,515
1923	—	9,566,187		148,474	9,714,661
1924	—	5,257,957		264,388	5,522,345
1925	14,354	5,996,585		265,384	6,276,323
1926	19,300	4,008,979		297,433	4,325,712

HIGHEST AND LOWEST IRON AND STEEL PRICES, 1914–1928.

	1914.			1918.			1920.			1922.			1924.			1926.			1928.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Marked Iron Bars,	9	0	0	20	0	0	33	10	0	16	0	0	15	0	0	14	10	0	12	10	0
S. Staffs	8	10	0	14	15	0	26	15	0	13	10	0	14	10	0	14	0	0	12	0	0
Common Iron Bars,	8	2	6	20	0	0	30	0	0	13	0	0	12	10	0	12	10	0	10	5	0
Cleveland	7	10	0	14	15	0	24	5	0	10	10	0	12	0	0	11	5	0	10	5	0
Steel Ship Plates, $\frac{3}{8}$-in.,	7	10	0	16	10	0	24	10	0	10	10	0	10	10	0	8	12	6	8	2	6*
Middlesbrough	7	0	0	11	10	0	20	0	0	9	0	0	9	10	0	7	5	0	8	7	6*
Steel Ship Angles,	7	5	0	16	2	6	24	0	0	10	0	0	10	0	0	7	17	6	7	12	6*
Middlesbrough	6	15	0	11	2	6	19	10	0	8	12	6	9	5	0	7	0	0	7	17	6*
Steel Ship Plates,	7	5	0	16	10	0	28	5	0	10	10	0	12	10	0	8	5	0	8	2	6*
Glasgow	6	17	6	11	10	0	21	10	0	8	5	0	9	15	0	7	7	6	8	7	6*
Steel Ship Angles,	7	0	0	18	2	6	26	10	0	10	0	0	10	0	0	8	2	6	7	12	6*
Glasgow	6	7	6	11	2	6	19	10	0	8	5	0				6	17	6	7	17	6*
Steel Boiler Plates,	8	5	0	17	10	0	31	0	0	14	10	0	14	0	0	11	10	0	11	0	0
Middlesbrough	8	0	0	12	10	0	23	0	0	12	10	0	13	0	0	11	5	0	11	10	0
Steel Boiler Plates,	7	5	0	17	10	0	31	10	0	14	10	0	14	0	0				10	10	0
Glasgow	7	0	0	12	10	0	24	0	0	12	10	0	13	0	0	11	0	0	10	10	0

* Subject to rebate.

WEEKLY TIME WAGE RATES OF SHIPYARD TIME WORKERS.

Grade of Workman.	Britain * (Tyne), October, 1928.	Germany (Hamburg). April 1, 1928.	Holland (Rotterdam). April 1, 1928.
	s. d.		
Skilled	58 6	10·34*d.* per hour	13·8*d.* per hour
Semi-skilled	44 6	—	13·0*d.* ,,
Unskilled	40 0	8·46*d.* ,,	11·0*d.* ,,

* Time wages in British yards have varied in the following manner since 1914. The figures given are the average of recognised rates for a full normal week, at the dates given, in nine principal centres :—

	Aug. 1914.	Dec. 1920.	Mar. 1926.	Sept. 1928.
	s. d.	s. d.	s. d.	s. d.
Shipwrights	41 4	91 3	55 7	58 7
Ship joiners	40 0	101 4	57 9	57 9
Labourers	22 10	70 5	38 5	39 11

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PRODUCTION OF IRON ORE IN PRINCIPAL COUNTRIES.

(Thousands of Tons, *i.e.* 000's omitted.)

Country.	1890.	1900.	1910.	1920.	1921.	1922.	1923.	1924.	1925.
Great Britain and Ireland	13,782	14,029	15,226	12,707	3,465	6,836	10,873	11,043	10,143
British Dominions.	—	519	1,571	795	2,196	802	1,391	800*	1,500§
British Empire	13,782	14,548	16,797	13,502	5,661	7,638	12,264	11,843	11,643
United States	16,036	27,549	56,890	57,598	29,282	47,128	69,350	54,035	61,908
Austria-Hungary	2,120	3,504	4,463	— †	735	1,140	1,192	— †	— †
Belgium	169	244	121	17	58	62	115	— †	— †
Czecho-Slovakia	—	—	—	1,036	788	308	664	— †	— †
France	3,417	5,362	14,376	13,703	13,976	20,774	23,059	28,533	35,741‖
Germany	7,577	12,592	22,075	6,261	5,799	5,906	—	4,700*	5,000*
Italy	218	243	542	384	275	306	336	169	490
Russia	1,701	6,004	4,523	161	133	221	477	2,098‡	— †
Spain	6,443	8,539	8,531	4,693	2,561	2,728	3,401	4,813	4,281
Other Countries	5,973	11,755	14,468	21,739	8,396	14,338	21,240	— †	18,000§
World total	57,436	90,340	142,786	119,094	67,664	100,549	132,098	149,000*	140,663*

* Estimated. † Not available. ‡ Fiscal year ended June, 1925. § Partly estimated. ‖ Including Saar District.

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VALUES OF UNITED KINGDOM IMPORTS, EXPORTS AND RE-EXPORTS.

Year.	Imports.	Exports.			Total Imports and Exports.
		British Produce.	Foreign and Colonial Produce.	Total Exports.	
	£	£	£	£	£
1900	523,075,163	291,191,996	63,181,758	354,373,754	877,448,917
1910	678,257,024	430,384,772	103,761,045	534,145,817	1,212,402,841
1913	768,734,739	525,253,595	109,566,731	634,820,326	1,403,555,065
1914	696,635,113	430,721,357	95,474,166	526,195,523	1,222,830,636
1915	851,893,350	384,868,448	99,062,181	483,930,629	1,335,823,979
1916	948,506,492	506,279,707	97,566,178	603,845,885	1,552,352,377
1917	1,046,164,678	527,079,746	69,677,461	596,757,207	1,660,921,885
1918	1,316,150,903	501,418,997	30,945,081	532,364,078	1,848,514,981
1919	1,626,156,212	798,638,362	164,746,315	963,384,677	2,589,530,889
1920	1,932,648,881	1,334,469,269	222,753,331	1,557,222,600	3,489,871,481
1921	1,085,500,061	703,399,542	106,919,306	810,318,848	1,895,818,909
1922	1,003,098,899	719,507,410	103,694,670	823,202,080	1,826,300,979
1923	1,096,226,214	767,257,771	118,543,805	885,801,576	1,982,027,790
1924	1,277,439,144	800,966,837	139,970,143	940,936,980	2,218,376,124
1925	1,320,715,190	773,380,702	154,036,799	927,417,501	2,248,132,691
1926	1,242,863,679	651,892,504	125,565,633	777,458,137	2,020,321,816
1927	1,219,387,424	709,105,402	123,062,727	832,168,129	2,051,555,553

* Excluding value of ships and boats (new) with their machinery: this item is included in the later figures.

VALUES OF UNITED STATES IMPORTS AND EXPORTS, SHOWING PER-CENTAGE CARRIED IN AMERICAN VESSELS.—(By Ten-Year Periods Generally.)

Fiscal Year.	By Sea (including all Great Lakes water-borne foreign Commerce).				By Land Vehicles.‡ Value in Dollars.	Total by Land and Sea. Value in Dollars.
	In American Vessels. Value in Dollars.	In Foreign Vessels. Value in Dollars.	Total. † Value in Dollars.	Per cent. American Vessels.		
1830	129,918,458	14,447,970	144,366,428	89·9	—	—
1840	198,424,609	40,802,856	239,227,465	82·9	—	—
1850	230,272,084	90,764,954	330,037,038	72·5	—	—
1860	507,247,757	255,040,793	762,288,550	66·5	—	—
1870	352,969,401	638,927,488	991,896,889	35·6	—	991,896,889
1880	258,346,577	1,244,265,433	1,482,612,011	17·4	20,981,393	1,503,593,404
1890	202,451,086	1,371,116,744	1,573,567,830	12·9	73,571,263	1,647,139,093
1900	195,084,192	1,894,444,424	2,089,528,616	9·3	154,895,650	2,224,424,266
1910	260,837,147	2,721,962,475	2,982,799,622	8·7	319,132,528	3,301,932,150
1913	381,032,496	3,392,028,429	3,773,060,925	10·1	505,831,459	4,278,892,384
1914	368,359,756	3,417,108,756	3,785,468,512	9·7	473,036,293	4,258,504,805
1915	571,931,912	2,420,693,563	3,992,625,475	14·3	450,133,605	4,442,759,080
1916	948,908,216	4,877,132,995	5,826,041,211	16·3	705,325,184	6,531,366,395
1917	1,452,086,468	6,367,408,665	7,819,495,133	18·6	1,129,908,446	8,949,403,579
1918	1,688,495,946	6,015,204,510	7,703,700,456	21·9	1,161,666,318	8,865,366,774
1919*	3,823,763,693	6,679,895,162	10,503,658,855	36·4	1,321,132,067	11,824,790,922
1920*	5,154,337,761	6,830,563,705	11,984,901,466	43·0	1,523,256,493	13,508,157,959
1921*	2,166,796,204	3,908,315,192	6,075,111,396	35·7	919,036,703	6,994,148,099
1922*	2,161,715,609	3,803,167,434	6,964,883,043	31·0	881,163,751	7,846,046,794
1923*	2,398,218,424	4,452,363,924	6,950,582,348	34·5	1,001,656,437	7,952,238,785
1924*	2,544,350,150	4,610,834,030	7,155,184,180	35·5	1,046,350,344	8,201,534,524
1925*	2,609,441,847	5,286,877,517	7,896,319,364	33·0	1,148,992,334	9,045,311,698
1926*	2,582,809,024	5,315,049,359	7,897,858,383	32·7	1,244,750,871	9,142,609,254
1927*	2,634,568,827	5,076,699,912	7,711,268,739	34·2	1,231,423,457	8,942,692,196

* Up to and including 1918, the statistics given are for years ended on June 30; from 1919 onwards they are given for calendar years.

‡ Including Parcels Post.

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IMPORTS AND EXPORTS OF THE UNDERMENTIONED COUNTRIES FOR THE YEARS 1913, 1926, AND 1927.

(In Millions of United States Dollars.)

Countries.	Imports.			Exports.		
	1913.	1926.	1927.	1913.	1926.	1927.
United Kingdom . .	3,741	5,421	5,336	3,089	3,162	3,451
United States . . .	1,793	4,415	3,923	2,484	4,712	4,759
France	1,625	2,366	2,071	1,328	2,367	2,164
Japan	364	1,118	1,046	315	957	953
Netherlands . . .	1,046	977	1,025	822	700	764
Spain	235	336	497	190	251	364
British India . . .	585	1,142	906	797	1,564	1,163
Australia	380	751	772	361	625	671
South Africa . . .	187	338	343	141	193	233
Norway	148	276	261	105	204	181
Belgium	895	638	807	701	540	738
Sweden	227	399	422	219	378	432
Brazil	327	324	392	318	386	436
ABOVE AS PERCENTAGES OF 1913 FIGURES.						
United Kingdom . .	100	145	102	100	102	112
United States. . .	100	246	219	100	190	192
France	100	146	127	100	178	163
Japan	100	307	287	100	304	303
Netherlands . . .	100	93	98	100	85	93
Spain	100	143	211	100	132	192
British India . . .	100	195	155	100	196	146
Australia	100	198	203	100	173	186
South Africa . . .	100	181	183	100	137	165
Norway	100	187	176	100	194	172
Belgium	100	71	90	100	77	105
Sweden	100	176	186	100	173	197
Brazil	100	99	120	100	121	137

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NATIONALITY AND NET TONNAGE OF VESSELS WHICH ENTERED AND CLEARED WITH CARGOES IN THE FOREIGN TRADE OF THE UNITED KINGDOM FOR THE YEARS 1913, 1926 AND 1927.

(Thousands of Net Tons).

Nationalty.	Entrances.			Clearances.			Percentage Entrances.			Percentage Clearances.		
	1913.	1926.	1927.	1913.	1926.	1927.	1913.	1926.	1927.	1913	1926.	1927.
	Tons.	Tons.	Tons.	Tons.	Tons	Tons.						
British	32,292	53,270	40,421	40,101	53,427	42,363	65·8	64·8	66·7	59·1	64·7	66·7
Foreign :—												
Norwegian	3,285	3,624	2,821	4,683	3,688	2,413	6·7	4·4	4·7	6·9	4·5	3·8
American	724	3,144	2,798	370	3,114	1,620	1·5	3·8	4·6	0·5	3·8	2·6
Swedish	1,891	1,879	1,726	3,016	1,893	1,470	3·9	2·3	2·8	4·5	2·3	2·3
Dutch	1,702	4,556	2,650	2,536	4,601	2,807	3·5	5·5	4·4	3·7	5·6	4·4
Danish	1,161	2,408	1,762	2,613	2,360	1,852	2·4	2·9	2·9	3·9	2·8	2·9
French	999	2,655	1,894	1,975	2,649	3,086	2·0	3·2	3·1	2·9	3·2	4·9
Belgian	1,369	1,362	1,324	957	1,356	1,072	2·8	1·7	2·2	1·4	1·6	1·7
Japanese	140	731	574	282	780	403	0·3	0·9	0·9	0·4	0·9	0·6
Spanish	1,060	990	786	1,694	1,018	1,383	2·2	1·2	1·3	2·5	1·2	2·2
Italian	122	—*	441	955	—*	902	0·2	—*	0·7	1·4	—*	1·4
Russian	678	—*	—*	937	—*	—*	1·4	—*	—*	1·4	—*	—*
Greek	221	—*	356	1,072	—*	1,042	0·4	—*	0·6	1·6	—*	1·6
German	3,166	4,371	2,085	5,730	4,370	1,908	6·4	5·3	3·4	8·5	5·3	3·0
Austro-Hungarian	128	—*	—*	715	—*	—*	0·3	—*	—*	1·0	—*	—*
Other Nationalities	125	3,288	954	185	3,352	1,177	0·2	4·0	1·7	0·3	4·1	1·9
Total Foreign	16,772	29,008	20,168	27,720	29,181	21,134	34·2	35·2	33·3	40·9	35·3	33·3
Total British and Foreign	49,064	82,278	60,589	67,821	82,608	63,497	100·0	100·0	100·0	100·0	100·0	100·0

* Included in Other Nationalities.

	Entrances and Clearances.			Percentages.		
	1913.	1926.	1927.	1913.	1926.	1927.
	Tons.	Tons.	Tons.			
British	72,393	106,697	82,784	62	65	67
Foreign	44,492	58,189	41,302	38	35	33
Total	116,885	164,886	124,086	100	100	100

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ENTRANCES AND CLEARANCES IN THE FOREIGN TRADE OF THE UNDERMENTIONED COUNTRIES FOR THE YEARS 1913, 1923, AND 1927.

Note.—C=With Cargo only. C & B=With Cargo and in Ballast.

Countries.		Entrances.			Clearances.		
		1913.	1923.	1927.	1913.	1923.	1927.
		Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.
United Kingdom	C	49,068	51,084	60,588	67,824	70,668	63,492
United States of America	C & B	53,280	66,319	53,292†	53,796	66,624	60,072†
France	C	34,512	41,818	49,056	26,112	30,750	41,528
Japan	C & B	24,720	37,548	49,308	24,900	37,056	49,812
Netherlands	C	17,148	16,272	28,284	11,016	11,532	23,220
Spain	C & B.	25,788	24,588	*	28,992	20,772	*
British India	C	6,700	6,573	7,536	8,256	7,787	7,764
Australia	C & B.	5,364	4,848	5,544	5,232	4,896	5,760
South Africa	C & B	5,352	5,137	5,268	5,280	5,005	5,256
Norway	C	3,756	3,192	3,708	4,740	4,092	5,772
Belgium	C	16,908	20,448	27,828	16,896	20,304	27,828
Sweden	C & B	13,764	12,192	11,556	17,004	12,337	13,716
Germany	C & B	26,580	30,372	37,644	26,640	30,900	29,352
ABOVE AS PERCENTAGES OF 1913 FIGURES.							
United Kingdom		100	104	123	100	104	94
United States of America		100	127	100†	100	124	112†
France		100	121	142	100	117	159
Japan		100	152	199	100	149	200
Netherlands		100	95	165	100	105	211
Spain		100	95	*	100	72	*
British India		100	98	112	100	94	94
Australia		100	90	103	100	94	110
South Africa		100	96	98	100	95	100
Norway		100	85	99	100	86	122
Belgium		100	121	165	100	120	165
Sweden		100	89	84	100	72	81
Germany		100	114	142	100	116	110

* Figures not available. † With cargo only.

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NUMBER AND NET TONNAGE OF VESSELS THAT PASSED THROUGH THE SUEZ CANAL IN THE YEARS 1913, 1923, 1926, AND 1927, DISTINGUISHING THE PRINCIPAL NATIONALITIES.

Nationality of Vessels.	Number of Passages.				Net Tonnage of Vessels.				Numbers as Percentages of Total.				Tonnages as Percentages of Total.			
	1913.	1923.	1926.	1927.	1913.	1923.	1926.	1927.	1913.	1923.	1926.	1927.	1913.	1923.	1926.	1927.
British	2951	2839	2744	3085	12,052,484	14,264,214	14,968,938	16,534,445	58·0	61·5	55·1	55·6	60·2	62·8	57·4	57·1
Japanese . . .	68	172	160	152	343,732	986,283	946,234	914,424	1·3	3·7	3·2	2·7	1·7	4·4	3·6	3·2
Dutch	342	451	544	575	1,287,354	2,178,058	2,858,944	3,024,848	6·7	9·8	10·9	10·4	6·4	9·6	11·0	10·4
French . . .	256	259	339	343	927,787	1,294,400	1,735,926	1,807,431	5·0	5·6	6·8	6·2	4·6	5·7	6·7	6·2
Italian	110	256	332	332	290,576	1,042,754	1,347,807	1,514,453	2·2	5·6	6·7	6·0	1·5	4·6	5·2	5·2
Danish	56	64	75	65	171,848	299,695	331,392	291,889	1·1	1·4	1·5	1·2	0·9	1·3	1·3	1·0
Norwegian . . .	44	87	112	142	93,313	335,597	492,054	661,797	0·9	1·9	2·2	2·6	0·5	1·5	1·9	2·3
American (U.S.) .	8	114	116	111	7,476	614,128	709,666	682,214	0·2	2·5	2·3	2·0	—	2·7	2·7	2·4
Swedish . . .	33	60	57	72	122,957	275,264	265,776	325,911	0·7	1·3	1·1	1·3	0·6	1·2	1·0	1·1
Greek	17	20	28	66	54,560	61,031	77,406	196,411	0·3	0·4	0·6	1·2	0·3	0·3	0·3	0·7
Spanish . . .	26	13	16	11	75,643	36,718	48,821	30,160	0·5	0·3	0·3	0·2	0·4	0·2	0·2	0·1
German . . .	778	247	424	529	3,352,287	1,213,691	2,153,873	2,763,783	15·3	5·4	8·5	9·5	16·7	5·4	8·3	9·5
Austria-Hungarian	246	—	—	—	845,830	—	—	—	4·8	—	—	—	4·2	—	—	—
Russian. . . .	110	23	7	13	340,595	73,896	44,021	59,019	2·2	0·5	0·1	0·2	1·7	0·3	0·1	0·2
All others . . .	40	16	26	49	67,422	54,433	79,519	155,263	0·8	0·1	0·7	0 0	0·3	0·0	0·3	0·6
Total . .	5085	4621	4980	5545	20,033,802	22,730,162	26,060,377	28,962,048	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

NOTE.—The above figures include not only Merchant Vessels and Mail Steamers, but also Warships and Transports as well as Government Chartered Vessels.

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NUMBER AND NET TONNAGE OF COMMERCIAL VESSELS THAT PASSED THROUGH THE PANAMA CANAL IN THE YEARS ENDED 30TH JUNE, 1920, 1921, 1922, 1923, 1924, 1926, AND 1928, DISTINGUISHING THE PRINCIPAL NATIONALITIES.

NOTE.—Commercial Vessels include all Vessels except those of the United States Government, or chartered by the U.S. Government to carry Government supplies, and Vessels of less than 10 tons measurement.

Nationality.	Number of Vessels.							Net Tonnage of Vessels.						
	1920.	1921.	1922.	1923.	1924.	1926.	1928.	1920.	1921.	1922.	1923.	1924.	1926.	1928.
British	753	972	935	1,065	1,265	1,423	1,842	2,760,188	3,978,329	3,795,526	4,892,338	6,097,611	7,039,542	8,976,960
American (U.S.A.)*	1,129	1,210	1,095	1,994	2,947	2,432	2,753	3,791,088	4,861,761	4,971,509	10,208,536	15,806,899	12,565,255	13,752,957
Norwegian . . .	106	140	113	147	136	306	313	397,632	548,227	385,007	597,359	546,633	987,040	1,181,189
Japanese	118	136	189	163	171	131	188	515,243	613,245	872,466	753,219	815,468	946,028	909,232
Chilian	79	83	53	62	47	26	32	212,000	159,727	150,398	201,411	176,472	121,901	124,959
Danish	9	60	53	65	65	63	69	32,221	236,512	227,473	240,053	245,929	234,753	285,396
Peruvian	75	60	60	80	70	64	53	191,689	157,495	161,930	216,829	189,046	149,162	140,323
Dutch	29	50	66	109	102	93	137	152,535	248,801	293,428	510,970	551,761	530,652	644,390
French	60	44	51	56	83	90	127	114,664	155,889	190,171	252,333	356,640	421,752	580,769
Spanish	41	44	9	14	45	31	46	106,651	117,400	27,264	41,201	172,572	121,461	157,465
Other Nationalities	79	113	112	212	299	538	896	272,133	338,490	342,287	691,537	1,159,847	1,657,045	2,704,894
Totals . . .	2,478	2,892	2,736	3,967	5,230	5,197	6,456	8,546,044	11,415,876	11,417,459	18,605,786	26,148,878	24,774,591	29,458,634

ABOVE AS PERCENTAGES.

	1920.	1921.	1922.	1923.	1924.	1926.	1928.	1920.	1921.	1922.	1923.	1924.	1926.	1928.
British	30·4	33·6	34·2	26·8	24·2	27·4	28·6	32·3	34·8	33·3	26·3	23·3	28·4	30·4
American (U.S.A.)*	45·6	41·8	40·0	50·3	56·3	46·8	42·6	44·4	42·6	43·5	54·9	60·5	50·7	46·7
Norwegian . . .	4·3	4·9	4·1	3·7	2·6	5·9	4·8	4·7	4·3	3·4	3·2	2·1	4·0	4·0
Japanese . . .	4·8	4·7	6·9	4·1	3·3	2·5	2·9	6·0	5·4	7·6	4·0	3·1	3·8	3·1
Chilian	3·2	2·2	2·0	1·6	0·8	5·0	0·5	2·5	1·4	1·3	1·1	0·7	0·5	0·5
Danish	0·3	2·1	2·0	1·6	1·2	1·2	4·1	0·4	2·1	2·0	1·3	0·9	1·0	1·0
Peruvian	3·0	2·1	2·2	2·0	1·3	1·2	0·8	2·2	1·4	1·4	1·2	0·7	0·6	0·5
Dutch	1·2	1·7	2·4	2·7	2·0	1·8	2·1	1·8	2·2	2·6	2·7	2·1	2·1	2·2
French	2·4	1·5	1·8	1·4	1·6	1·7	2·0	1·3	1·4	1·7	1·4	1·5	1·7	2·0
Spanish	1·6	1·5	0·3	0·3	0·9	6·0	0·7	1·2	1·0	0·2	0·2	0·7	0·5	0·5
Other Nationalities	3·2	3·9	4·1	5·5	5·8	0·5	13·9	3·2	2·9	3·0	3·7	4·4	6·7	9·1
Totals . . .	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

* Includes Vessels engaged in the coasting trade of the U.S.A., which is carried on *entirely* by National Ships.

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CARGOES (IN TONS WEIGHT) CARRIED IN COMMERCIAL VESSELS THAT PASSED THROUGH THE PANAMA CANAL DURING THE YEARS ENDED 30TH JUNE, 1919, 1920, 1921, 1922, 1923, 1924, 1926, AND 1928, DISTINGUISHING THE PRINCIPAL NATIONALITIES.

Nationality of Vessels.	Weight of Cargoes carried.							
	1919.	1920.	1921.	1922.	1923.	1924.	1926.	1928.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
British . .	1,876,939	2,830,268	3,738,257	3,329,861	4,929,317	6,051,842	6,750,843	8,075,022
American (U.S.A.) .	2,758,886	4,547,140	5,163,025	4,950,519	11,055,150	16,654,435	13,710,956	14,258,735
Norwegian .	577,679	404,323	637,887	408,268	704,292	539,101	1,051,276	1,268,124
Japanese .	503,427	726,338	758,617	1,044,515	943,400	935,245	667,982	1,041,166
Chilian . .	161,340	104,738	61,737	46,182	76,670	107,147	82,695	81,678
Danish . .	325,277	42,533	322,059	272,779	307,876	317,274	295,530	380,240
Peruvian .	121,524	119,418	105,322	64,370	111,519	102,136	94,778	96,175
Dutch .	119,297	128,442	216,488	290,573	487,957	573,929	552,741	637,178
French . .	286,812	125,249	132,836	139,463	230,175	407,249	398,393	600,421
Spanish .	10,047	101,563	143,076	23,701	32,178	67,903	49,956	104,606
Other Nationalities .	175,393	244,487	319,910	314,679	689,341	1,238,449	2,382,298	3,097,364
Totals .	6,916,621	9,374,499	11,599,214	10,884,910	19,567,875	26,994,710	26,087,448	29,630,709

ABOVE AS PERCENTAGES.

	1919.	1920.	1921.	1922.	1923.	1924.	1926.	1928.
British . .	27·1	30·2	32·2	30·6	25·2	22·4	25·9	27·2
American (U.S.A.) .	39·9	48·5	44·5	45·5	56·5	61·7	52·7	48·2
Norwegian .	8·4	4·3	5·5	3·7	3·6	2·0	4·0	4·3
Japanese .	7·3	7·7	6·5	9·6	4·8	3·5	2·6	3·5
Chilian . .	2·3	1·1	0·5	0·4	0·4	0·4	0·3	0·3
Danish . .	4·7	0·5	2·8	2·5	1·6	1·2	1·1	1·3
Peruvian .	1·8	1·3	0·9	0·6	0·6	0·4	0·4	0·3
Dutch . .	1·7	1·4	1·9	2·7	2·5	2·1	2·1	2·2
French . .	4·2	1·3	1·2	1·3	1·2	1·5	1·5	2·0
Spanish . .	0·1	1·1	1·2	0·2	0·2	0·3	0·2	0·3
Other Nationalities .	2·5	2·6	2·8	2·9	3·4	4·5	9·2	10·4
Totals .	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

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OCEAN DISTANCES FROM THE BRITISH ISLES.
(Steaming Distances in Nautical Miles.)

I.—CONTINENT.

	Archangel.	Christiania.	Copenhagen.	Stockholm.	Danzig.	Hamburg.	Amsterdam.	Rotterdam.	Antwerp.	Havre.	Bordeaux.	Bilbao.	Lisbon.	Gibraltar.
Cardiff .	2,259†	1,060*	1,126*	1,498*	1,400*	839	577	553	541	367	531	561	878	1,145
Glasgow .	2,036†	930†	996†	1,408†	1,280†	490	818	794	782	610	778	808	1,093	1,400
Liverpool .	2,104†	1,005†	1,066†	1,478†	1,340†	942	711	687	675	503	671	701	1,010	1,290
London .	2,106	702	700	1,180	989	427	188	177	180	198	682	712	1,058	1,325
Sunderland	1,755	520	586	998	860	413	258	266	327	397	896	915	1,225	1,615

* South about. † North about.

II.—MEDITERRANEAN, BLACK SEA AND RED SEA.

	Marseilles.	Naples.	Messina.	Malta.	Genoa.	Trieste.	Athens.	Constantinople.	Odessa.	Batoum.	Smyrna.	Alexandria.	Port Said.	Aden.
Cardiff .	1,870	2,080	2,170	2,135	2,039	2,804	2,630	2,910	3,230	3,490	2,765	2,922	3,075	4,515
Glasgow .	2,085	2,295	2,475	2,350	2,254	3,019	2,864	3,125	3,445	3,705	2,980	3,137	3,300	4,730
Liverpool .	1,975	2,265	2,367	2,240	2,144	2,909	2,759	3,069	3,335	3,595	2,870	3,083	3,290	4,620
London .	2,050	2,260	2,354	2,315	2,219	2,984	2,810	3,190	3,410	3,670	2,945	3,122	3,248	4,695
Sunderland	2,222	2,540	2,520	2,511	2,381	3,164	2,990	3,370	3,690	3,950	3,225	3,382	3,445	4,975

III.—AFRICA AND EASTERN ATLANTIC, ETC.

	Azores.	St. Vincent (C.V.I.)	Las Palmas.	Bathurst.*	Freetown.	Lagos.	Ascension.	Loanda.†	St. Helena.	Cape Town.	Durban.	Mauritius.‡	Melbourne‡ (Australia).	Hobart‡ (Tasmania).
Cardiff .	1,330	2,345	1,523	2,484	2,838	3,968	3,775	4,841	4,472	5,947	6,721	8,273	11,761	11,785
Glasgow .	1,495	2,560	1,745	2,706	3,059	4,189	3,940	5,056	4,637	6,168	6,942	8,494	11,982	12,006
Liverpool .	1,385	2,450	1,655	2,616	2,962	4,097	3,830	4,946	4,527	6,076	6,850	8,402	11,890	11,914
London .	1,460	2,525	1,699	2,660	3,008	4,138	3,900	5,021	4,597	6,117	6,891	8,443	11,931	11,955
Sunderland	1,740	2,805	1,890	2,851	3,199	4,329	4,185	5,301	4,882	6,308	7,082	8,834	12,122	12,146

* *Via* Tenerife and Dakar. † *Via* St. Vincent (C.V.I.) ‡ *Via* Cape Town.

IV.—INDIAN OCEAN, ETC. (*via* SUEZ).

	Karachi.	Bombay.	Colombo.	Zanzibar.	Mauritius.	Madras.	Calcutta.	Rangoon.	Singapore.	Batavia.	Freemantle (W. Australia)	Adelaide.	Melbourne.	Hobart.
Cardiff .	5,930	6,150	6,615	6,195	6,825	7,016	7,610	7,845	8,165	8,450	9,745	10,712	11,070	11,100
Glasgow .	6,145	6,365	6,830	6,433	7,040	7,120	7,854	8,060	8,380	8,635	9,960	10,953	11,285	11,315
Liverpool .	6,135	6,255	6,720	6,220	6,930	7,065	7,750	7,955	8,270	8,555	9,850	10,847	11,175	11,330
London .	6,110	6,330	6,535	6,295	7,005	7,040	7,795	7,935	8,345	8,630	9,665	10,890	11,250	11,380
Sunderland	6,390	6,610	6,975	6,575	7,285	7,250	7,986	8,135	8,625	8,815	10,105	11,090	11,420	11,560

V.—CHINA, JAPAN, ETC. (*via* SUEZ).

	Saigon.	Hong Kong.	Shanghai.	Nagasaki.	Yokohama.	Vladivostock.*	Fiji Islands.	Manilla.	Brisbane (*via* Torres Strait).	Sydney (N.S.W.)	Auckland (N.Z.)	Wellington (N.Z.)	Honolulu.	San Francisco.
Cardiff .	8,805	9,718	10,470	10,595	11,065	11,250	11,540	9,470	11,788	11,520	12,400	12,420	13,150	13,490
Glasgow .	9,020	9,815	10,712	10,819	11,280	11,414	11,755	9,814	12,028	11,764	12,655	12,660	13,365	13,705
Liverpool .	8,910	9,856	10,665	10,700	11,170	11,355	11,645	9,575	11,924	11,600	12,545	12,560	13,955	13,795
London .	8,985	9,900	10,650	10,775	11,245	11,430	11,720	9,750	11,961	11,708	12,625	12,612	14,010	13,800
Sunderland	9,265	10,060	10,820	11,055	11,525	11,710	12,000	9,930	12,152	11,900	12,790	12,850	14,220	13,950

* *Via* Nagasaki.

VI.—AMERICA.

	Quebec.	Halifax, N.S.	New York.	Boston.	Jamaica.	New Orleans.	Panama.	Colon.	Pernambuco.	Bahia.	Rio de Janeiro.	Montevideo.	Buenos Ayres.	Valparaiso.
Cardiff .	2,750	2,505	3,065	2,782	4,030	4,510	4,527	4,487	3,950	4,375	5,020	5,990	6,100	8,690
Glasgow .	2,618	2,390	3,280	3,065	4,245	4,725	4,665	4,625	4,165	4,540	5,235	6,205	6,315	8,905
Liverpool .	2,655	2,455	3,052	2,805	4,135	4,615	4,570	5,530	4,055	4,430	5,125	6,095	6,205	8,795
London .	3,072	2,685	3,245	3,030	4,210	4,790	4,782	4,742	4,130	4,505	5,200	6,370	6,280	8,870
Sunderland	3,240	2,665	3,450	2,803	4,490	4,970	4,975	4,935	4,410	4,785	5,480	6,450	6,560	9,250

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LIST OF THE PRINCIPAL COMMERCIAL FUEL-OIL BUNKERING STATIONS ESTABLISHED THROUGHOUT THE WORLD.

VARIOUS publications, British and American, interested in oil or shipping matters furnish particulars from time to time of fuel-oil bunkering stations, either by way of more or less comprehensive general lists or of announcements by oil-distributing companies. Some of the more comprehensive lists, whilst valuable as showing the widespread provision of fuel oil supplies already made or contemplated, do not in all cases, however, distinguish between installations in actual operation and those under construction, or clearly indicate whether Government installations are the only ones existing at particular ports. In compiling the following list from many sources, our aim has been to specify the principal bunkering ports at which commercial oil installations are in operation. Whilst absolute accuracy cannot be guaranteed, much care has been taken to eliminate errors.

Aalborg (Denmark)
Aarhus
Abadan (Persia)
Aberdeen
Abo (Finland)
Adelaide
Aden
Ajaccio
Alexandria
Algiers
Almeria
Amoy (China)
Amsterdam
Ango-Ango (Congo)
Antilla
Antofagasta (Chile)
Antwerp
Aomori
Arica (Chile)
Astoria
Auckland (N.Z.)
Augusta (Sicily)
Avonmouth
Azores (Ponta Delgada)
Bahia (Brazil)
Bahia Blanca (Arg.)
Balboa (Panama)
Balik Pappan (Borneo)
Baltimore
Bangkok (Siam)
Barcelona
Barranquilla (Colombia)
Barrow
Barton
Basrah
Batavia
Baton Rouge (La.)
Batum
Bayonne, N.J.
Baytown
Beaumont (Texas)
Beira
Belfast
Belize (Honduras)
Bergen
Bermuda
Bilbao
Birkenhead
Bizerta (Tunis)
Boelbaai Ceram
Boma (Congo)
Bombay
Bordeaux
Boston (U.S.A.)
Bourgas (Turkey)
Bremen
Brest
Bridgetown (Barbadoes)
Brighton (Trinidad)
Brixham
Brunsbuettel-Ostermoor
Brunswick
Buenos Aires
Cadiz
Calcutta
Caleta Buena (Chile)
Callao
Campana
Canton
Cape Town
Cardiff
Casablanca
Cebu (Philippines)
Ceram (D.E.I.)
Ceuta
Charleston
Cherbourg
Chittagong (India)
Cienfuegos (Cuba)
Civita Vecchia
Claxton Bay (Trinidad)
Cochin (India)
Colombo
Colon (Pan. Canal)
Conception del Uruguay
Constantinople
Constanza
Copenhagen
Corinto (Nicaragua)
Cork
Corunna
Cristobal
Curacao
Dakar (W. Africa)
Dantzig
Destrehan
Donges
Dover
Dublin
Dunkirk
Durban
Emden
Eten (Peru)
Eureka
Fall River (Mass.)
Falmouth
Fayal
Ferrol
Folkestone
Foochow
Fort William (Ont.)
Foynes
Fredericia
Fremantle
Funchal
Galveston
Gemsah
Genoa
Georgetown
Gibraltar
Glasgow
Gothenburg
Granatello (Italy)
Graney Island (Va.)
Grangemouth
Granton
Grimsby
Guayaquil
Gulf Port (Miss.)
Halifax (Canada)
Hamburg
Hamilton (Ont.)
Hankow
Harwich
Havana
Havre
Helsingfors
Hong Kong
Honolulu
Houston (Texas)
Hull
Hurghada
Ichang (China)
Ilo Ilo (Philip. Is.)
Immingham
Iquique (Chile)
Itosaki
Jacksonville (Fla.)
Jarrow-on-Tyne
Junin (Chile)
Karachi
Ketchikan
Kettle Point (R.I.)
Key West
Kiel
Kingston (Jamaica)
Kiu Kiang
Kobe
La Guayra (Venez.)
La Pallice
La Plata (Argentine)
La Rochelle
Las Palmas
Leghorn
Leith
Levis
Lisbon
Liverpool
Lobitos
London:
Thameshaven.
Purfleet, etc.

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Lorient
Los Angeles
Lourenço Marques
Macassar (Celebes)
Madras
Malmo
Malta
Manati (Cuba)
Manchester Ship Canal
Manila
Maracaibo (Venez.)
Marmagoa (India)
Marseilles
Mantanzas (Cuba)
Mauritius
Mejillones (Chile)
Melbourne
Messina (Sicily)
Middlesbrough
Minatitlan (Mexico)
Miri
Mobile (Alabama)
Mollendo (Peru)
Mombasa
Monopoli
Montevideo
Montreal
Nagasaki
Naples
Neuvitas (W. Indies)
Newcastle-on-Tyne
New Orleans
New York
Niigata (Japan)
Nonai
Nordenham
Norfolk (Va.)
Nyborg
Odense (Denmark)
Oleum (Cal., U.S.A.)
Oran
Oslo
Pago Pago (Samoa)
Paitaz (Peru)
Palembang (Sumatra)
Palermo
Palo Blanco (Mex.)
Pangkalan - Berandan
Papeete (Tahiti)
Para (Brazil)
Paramaribo (Dutch Guiana)
Passaic (N.J.)
Payta
Penang
Pensacola (Florida)
Perim
Pernambuco
Philadelphia
Piræus
Pisagua
Plymouth
Point à Pierre (Trinidad)
Point Fortin (Trinidad)
Point Wells
Ponce
Ponta Delgada (Azores)
Port Arthur (Texas)
Port Edgar
Portici
Portishead
Portland (Maine)
Portland (Ore.)
Port of Spain
Port St. Luis du Rhone (France)
Port Said
Port Sudan
Prince Rupert (B.C.)
Providence (R.I.)
Puerto Barrios (Guatemala)
Puerto Cabello (Venez.)
Puerto Mexico
Puloe Samboe
Pulo Bukom
Pulo Solsoe
Quebec
Rangoon
Regla (Cuba)
Richmond (Va.)
Rio de Janeiro
Rochefort
Rosyth
Rotterdam
Rouen
Sabang
Sabine
Saigon (French Cochin China)
Saitozaki
St. Georges
St. John (N.B.)
St. Nazaire
St. Thomas
St. Vincent
Salina Cruz (Mex.)
Salinas (Chili)
Salonica
San Antonio (Chile)
San Diego
San Domingo
San Francisco
San Juan (P. Rica)
San Luis Obispo (Cal., U.S.A.)
San Pedro (Cal.)
Santander
Santos (Brazil)
Sarnia
Savannah
Savona
Seattle (Wash.)
Shanghai
Singapore
Smyrna
Soerabaya (Java)
Southampton
South Shields
Spezia
Stavanger
Stettin
Stockholm
Strasburg
Suez
Sunderland
Supe (Peru)
Svolvaer (Norway)
Swansea
Swatow (China)
Sydney
Tacoma
Talara (Peru)
Taltal (Chile)
Tambes (Peru)
Tampa (Florida)
Tampico (Mexico)
Tarakan (Borneo)
Teneriffe
Texas City
Tientsin
Tocopilla (Chile)
Toronto
Toulon
Trieste
Trinidad
Trondjhem
Tsuchizaki (Japan)
Tunis
Tuticorin (India)
Tuxpan (Mexico)
Vado
Vallo (Norway)
Valparaiso
Vancouver
Venice
Vera Cruz (Mexico)
Victoria (B.C.)
Vlaardingen
Wellington (N.Z.)
Willbridge
Willemstad (Curacao)
Yati (Paraguay)
Yokohama
Zanzibar

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BRITISH NAVAL AND SHIPPING ORGANISATIONS.

Aberdeen Shipbuilders' Association: Chairman, A. Hall-Wilson; Secretary, James Hay: Address, 6, Bon Accord Square, Aberdeen, N.B.

Amalgamated Engineering Union: Chairman, J. T. Brownlie, O.B.E.; Secretary, A. H. Smethurst: Address, 110, Peckham Road, London, S.E. 15.

Amalgamated Marine Workers' Union: President, A. Cannon: Secretary, J. McKinlay: Address, 41, Gower Street. London, W.C. 1.

Average Adjusters, Association of: Chairman, A. C. Smith; Secretary, A. F. Greenwood: Address, 70, Old Broad Street, London, E.C. 2.

Baltic Mercantile and Shipping Exchange, Ltd.: Chairman, John E. Parry; Secretary, J. A. Findlay: Address, 24–28, St. Mary Axe, London, E.C. 3.

Barrow Shipbuilders' Association: Chairman, John Barr, C.B.E.; Secretary, G. P. Lancaster: Address, Naval Construction Works, Barrow-in-Furness.

Belfast Shipowners' Association: Chairman, Sir George S. Clark, Bt., D.L.; Hon. Secretaries, G. Heyn & Sons, Ltd.; Telephones, Belfast 2097–99; Telegrams, "Heyn, Belfast": Address, Head Line Buildings, Victoria Street, Belfast.

Birkenhead Shipbuilding Employers' Association: Chairman, R. S. Johnson, O.B.E.; Secretary, H. M. Hinchliffe: Address, Shipbuilding and Engineering Works, Birkenhead.

Blacksmiths' and Ironworkers' Society of Great Britain and Ireland: Secretary, William Lorimer: Address, 177, Hill Street, Charing Cross, Glasgow.

Boiler Makers and Iron Shipbuilders' Society: Chairman, Mark Hodgson; Vice-Chairman, C. W. Church; General Secretary, John Hill, J.P.; Assistant Secretary, Councillor John Barker: Address, Lifton House, Eslington Road, Newcastle-on-Tyne.

Border Counties Engineering Trades Employers' Association: Secretary, James Cameron: Address, Bolbec Hall, Westgate Road. Newcastle-on-Tyne.

Bristol Steamship Owners' Association: Chairman, W. G. McCann; Hon. Secretary, A. S. Ray; Telephone, Bristol 1836: Address, 18, St. Augustine's Parade, Bristol.

Britannia Steam Ship Insurance Association, Ltd.: Chairman, Sir Ernest W. Glover, Bt.; Managers, Tindall Riley & Co.: Address, 17, Gracechurch Street, London, E.C. 3.

British Bankers' Association: Chairman, R. M. Holland-Martin; Secretary, E. Sykes; Telephone, Avenue 3103: Address, 5, Bishopsgate, E.C. 2.

British Chambers of Commerce, Association of: President, Gilbert C. Vyle; Deputy President, Sir James Martin, J.P.; Secretary, R. B. Dunwoody, C.B.E.; Telephone, Victoria 3154; Address, 14, Queen Anne's Gate, S.W. 1.

British Coal Exporters Federation: Secretary, R. M. Stewart; Telephone, Victoria 3679: Address, 27, Abingdon Street, S.W. 1.

British Coasting & Near Trades' Shipowners' Association: Chairman, T. E. Brown; Secretary, J. G. Rutherford: Address, 45 & 46, West Sunniside, Sunderland.

British Cold Storage and Ice Association: Chairman, Sir Gordon H. Campbell; Hon. Secretary, J. Raymond: Address, Weavers' Hall, 22, Basinghall Street, London, E.C. 2.

British Corporation for the Survey and Registry of Shipping: Hon. President, Sir Archibald Denny, Bt., LL.D.; Chairman, Robert Clark; Vice-Chairman, Sir Wm. H. Raeburn, Bt.; Chief Surveyor, J. Foster King, C.B.E.; Secretary, John Fleming; Telephone Numbers, Cent. 8152 and 8153; Telegraphic Address, "Seaworthy, Glasgow": Address, 14, Blythswood Square, Glasgow.

British Engineering Standards Association: Chairman, Maurice F. G. Wilson; Secretary, C. le Maistre, C.B.E.; Telephone, Victoria 3127: Address, 28, Victoria Street, London, S.W. 1.

British Engineers' Association, Inc.: President, H. J. Ward, M.A.; Secretary, Alfred Parker: Address, 32, Victoria Street, London, S.W. 1.

British Industries, Federation of: President, Lord Gainford, P.C.; Secretary, D. L. Walker; Telephones, Regent 6050–6056; Telegrams, "Fobustry, Piccy, London": Address, 39, St. James's Street, London, S.W. 1.

British Marine Mutual Insurance Assn.: Chairman, E. P. Lindley; Managers, E. R. Evans & Co.; Telephone, Avenue 5535: Address, 12, Lime Street, E.C. 3.

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British Maritime Committee: Chairman, The Rt. Hon. Lord Merrivale, P.C.; Hon Secretary, G. P. Langton, K.C.; Asst. Hon. Secretary, G. St. C. Pilcher; Telephone, Cent. 2251: Address, 4, King's Bench Walk, Temple, E.C. 4.

British Mercantile Marine (National Maritime Board): Chairmen, F. C. Allen and J. Havelock Wilson, C.H., C.B.E.; General Secretary, G. A. Vallance; Telephone, Holborn 3074; Telegrams, "Joisec, London": Head Office, 3 and 4, Clements' Inn, London, W.C. 2.

British Nautical Instrument Trade Association: Secretaries, Biggart and Lumsden: Address, 105, West George Street, Glasgow.

British Passenger Agents' Association: President, H. K. Scott; Hon. Secretary, Charles Wright: Address, 22, Watergate Street, Chester.

British Sailing Ship Owners' Association, Ltd.: Acting-Chairman, A. Westcott; Secretary, H. M. Cleminson: Address, 24, St. Mary Axe, London, E.C. 3.

British Sailors' Society, Inc.: President, The Rt. Hon. Lord Radstock, C.B.E.; Hon. Treasurer, Sir Ernest Glover, Bart.; Chairman of Finance, L. D. Lewis; General Secretary, Herbert E. Barker; Telephones, East 4350–1; Telegrams, "Sailordom, Step. London": Address, The Passmore Edwards Sailors' Palace, 680, Commercial Road, London, E. 14.

British Shipowners' Mutual Protection and Indemnity Association, Ltd.: Managers, A. Bilbrough & Co., Ltd.: Address, 23, Rood Lane, London, E.C. 3.

Bureau Veritas: Chief Representative for the U.K., G. M. Milne: Address, 155, Fenchurch Street, London, E.C. 3.

Cardiff and Bristol Channel Incorporated Shipowners' Association: Chairman, G. Leighton Seager; Secretary, W. R. Hawkins; Telephone, Cardiff, 242; Telegrams, "Ships, Cardiff"; Address, 6, The Exchange, Cardiff.

Chamber of Shipping of the United Kingdom: President, Sir Wm. Seager; Vice-President, Sir William Currie; General Manager, H. M. Cleminson; Assistant General Manager, P. M. Hill; Secretary, H. J. Spratt; Telephone, Avenue 7360; Telegrams, "Logboard, Stock, London": Address, 28, St. Mary Axe, London, E.C. 3.

Chartered Shipbrokers, Institute of: President, J. F. Fawcett; Secretary, J. A. Findlay: Address, 24, St. Mary Axe, London, E.C 3.

Clyde Shipbuilders' Association: President, J. B. Hutchison; Secretary, D. Higgins: Address, Fyfe Chambers, 105, West George Street, Glasgow.

Clyde Steamship Insurance Association, Ltd.: Chairman, John Denholm; Secretaries, Walter Patterson, M.B.E., J.P., and Wm. Brash: Address, 94, Hope Street, Glasgow.

Clyde Steamship Owners' Association: President, John Denholm; Secretaries, Walter Patterson, M.B.E., J.P., and Wm. Brash: Address, 94, Hope Street, Glasgow.

Company of Master Mariners: Deputy Master, Sir Burton Chadwick; Secretary, W. T. C. Smith: Address, 84, Leadenhall Street, London, E.C. 3; Tel. No. Avenue 1183.

Consulting Marine Engineers and Ship Surveyors, The Society of: President, J. D. Young; Vice-Presidents, C. E. Kendall and W. Binnie; Secretary, R. K. Munro: Address, 6, Lloyd's Avenue, London, E.C. 3.

Dock and Harbour Authorities' Association: President, Sir Hugh Bell, Bt., C.B.; Hon. Secretary, W. C. Thorne: Address, 13, Victoria Street, S.W. 1.

Documentary Committee: Chamber of Shipping; Chairman, Sir F. Vernon Thomson; K.B.E.; Secretary, R. B. Brown; Telephone, Avenue 7360: Address, 28, St. Mary Axe, E.C. 3.

Dublin Shipowners' Society: Secretary, David Barry, 27, Sir John Rogerson's Quay, Dublin.

Dundee Shipbuilders' Association: President, Grant Barclay; Secretary, Robert Fothergill: Address, Stannergate Shipyard, Dundee.

Dundee Shipowners' and Shipbrokers' Association: Secretary, William Kinnear, 18, Commercial Street, Dundee.

East of Scotland Engineering and Allied Employers' Association: President, W. Wallace; Secretary, A. Gray Muir: Address, 19, York Place, Edinburgh.

Empire Steamship Assurance Association, Ltd.: Managers, A. Bilbrough & Co., Ltd.; Address 23, Rood Lane, London, E.C. 3.

Employers' Association of the Port of Liverpool: Chairman, Charles Booth; Secretary, W. Awstun Jones: Address, Dock Board Building, Pier Head, Liverpool.

Engineering and Allied Employers' National Federation: Chairman, Sir Allan McGregor Smith, K.B.E., M.A.; Joint Secretaries, James Brown and W. G. Campbell; Telephone, Vic. 8280: Address, Broadway House, Tothill Street, Westminster, S.W. 1.

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Engineering and Allied Employers' National Federation, Birkenhead and District Association: Chairman, R. S. Johnson, O.B.E.; Secretary, Herbert M. Hinchliffe: Address, Shipbuilding and Engineering Works, Birkenhead.

Engineering and Shipbuilding Draughtsmen, Association of: Secretary, Peter Doig; Address, 96, St. George's Square, London, S.W. 1.

Engineering and Shipbuilding Trades, Federation of: President, Will Sherwood; Vice-President, E. Pacey; Treasurer, W. Lorimer; Secretary, F. Smith; Telephone, Museum 3078: Address, 374, Gray's Inn Road, London, W.C. 1.

Fisheries Organisation Society, Ltd.: President, Cecil B. Harmsworth; Secretary, A. Shaw: Address, 53, Victoria Street, London, S.W. 1.

General Register and Record Office of Shipping and Seamen: Registrar-General, Paymaster Commander J. Blake Harrold, O.B.E., R.N.R.; Assistant Registrar-General, Timothy Crone; Senior Staff Officer, F. Middleton; Telephones, Royal 0774–0777; Telegrams, "Registrar, Seaman (Ald.) London": Address, Tower Hill, London, E.C. 3.

Glasgow Association of Underwriters: Chairman, R. G. Service; Secretary, Wm. Stewart Howford: Address, Royal Exchange, Glasgow.

Glasgow Shipowners' Association: Chairman, W. S. Workman; Deputy Chairman, W. Betts Donaldson; Secretary, Jas. A. Mackenzie; Telephone, Central 6606, Glasgow; Telegrams, "Maritime, Glasgow": Address, 150, St. Vincent Street, Glasgow.

Glasgow Stevedores' Association: President, Patrick O'Malley; Vice-President, Wm. H. Bain, V.D., R.N.V.R., M.P.; Hon. Secretary, Robert S. Renfrew: Address, 29, Tunnel Street, Finnieston, Glasgow.

Goole Steamship Owners' Association: Secretary, J. Umpleby, St. John's Street, Goole.

Gravesend Sea School: Chairman, Captain H. Douglas King, C.B.E., D.S.O.; Captain, Captain O. H. Lewis; Secretary, Miss D. A. Wigner: Address, 52, Leadenhall Street, London, E.C. 3.

Hartlepools Shipowners' Society: Chairman, Sir John H. Ropner, Bart.; Secretary, William Allen: Address, 4, Victoria Terrace, West Hartlepool.

Hull Incorporated Chamber of Commerce and Shipping: Chairman, Shipping Section: W. Minnitt Good; Secretary, A. Whitehead: Address, Samman House, Bowlalley Lane, Hull.

Hull Mutual Steamship Protecting Society: Chairman, James Cormach; Secretaries, Jackson, Beaumont & Co.: Address, Samman House, Bowlalley Lane, Hull.

Humber District Association of Chartered Shipbrokers: Chairman, A. J. Atkinson, J.P.; Joint Hon. Secretaries, T. H. Stone and Wm. Fenton: Address, Quay Street, Hull.

Imperial Merchant Service Guild: Chairman, Captain G. Breckon; Vice-Chairman, Captain A. O. M. Cooper; Secretary, Lieut. T. W. Moore, C.B.E., R.N.R.; Chief Assistant Secretary, G. B. Say, M.B.E.; Telephones, Bank 8971–2; Telegrams, "Dolphin, Liverpool": Head Office, The Arcade, Lord Street, Liverpool.

Incorporated Soldiers' and Sailors' Help Society: President, Field-Marshal H.R.H. The Duke of Connaught and Strathearn, K.G.; Chairman of Executive Committee, The Countess Roberts, D.B.E.; Vice-Chairman, Sir Harry Greer; Secretary, Major-General Sir Bertram Boyce, K.C.M.G., C.B., D.S.O.; Telephone, Sloan 2144; Telegrams, "Peaceful, Knights, London": Address, 122, Brompton Road, London, S.W. 3.

Industrial League and Council (Inc.): President, Viscount Burnham, C.H.; Secretary, John Ames; Telephone, Victoria 6449: Address, 82, Victoria Street, London, S.W. 1.

International Chamber of Commerce: President, Senor Alberto Pirelli; General Secretary, E. Dolleans: Address, 33, Rue Jean Goujon, Paris.

International Chamber of Commerce: British National Committee: Chairman, Sir A. Balfour, K.B.E.; Secretary, R. W. Hanna: Address, 14, Queen Anne's Gate, S.W. 1.

International Shipping Conference: Secretary, H. M. Cleminson; Assistant Secretary, P. Maurice Hill: Address, 24, St. Mary Axe, London, E.C. 3.

International Shipping Federation, Ltd.: Chairman, The Viscount Inchcape, G.C.S.I., G.C.M.G., K.C.I.E.; General Manager, Cuthbert Laws; Secretary, Michael Brett: Chief Office, 24, St. Mary Axe, London, E.C. 3.

Isle of Wight Shipbuilding and Engineering Employers' Association: Chairman, P. D. Ewing, C.B.E.; Vice-Chairman, A. J. Guttridge; Secretary, S. Lovett: Address, c/o J. Samuel White & Co., Ltd., East Cowes, I.o.W.

King George's Fund for Sailors (Inc.): Patron, H.M. The King; President, H.R.H. The Duke of York, K.G.; Chairman of General Council, H.R.H. The Duke of Connaught, K.G.; Deputy Chairman, Capt. Sir Arthur W. Clarke, K.B.E.; Telephone, Central 7240: Address, Trinity House, E.C. 3.

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Lancashire and National Sea Training Homes for Boys: President, The Rt. Hon. the Earl of Derby, K.G.; Chairman, Sir Alfred Read: Superintendent, Captain D. Agnew, N.R.; Hon. Treasurer, A. B. Cauty; Secretary, Comdr. C. Gore, R.N. (ret.); Telephone, Central 3887: Address, 734, Tower Building, Water Street, Liverpool.

Leith Shipowners' Society: Chairman, James Currie, LL.D.; Hon. Secretary, James Low: Address, 7, John's Place, Leith.

Liverpool and London Steamship Protection and Indemnity Association, Ltd.: Chairman, J. Bruce Ismay; Manager and Secretary, Vivian D. Heyne; Assistant Manager, Wm. Goffey; Adviser to the Committee, Sir Norman Hill, Bt.; Telephone, Central 1446 (3 lines); Telegrams, "Grayhill, Liverpool": Address, 10, Water Street, Liverpool.

Liverpool and London War Risks Insurance Association, Ltd.: Chairman, J. Bruce Ismay; Manager and Secretary, Vivian D. Heyne; Assistant Manager, William Goffey; Adviser to the Committee, Sir Norman Hill, Bt.; Telephone, Central 1446 (3 lines); Telegrams, "Warisks, Liverpool": Address, 10, Water Street, Liverpool.

Liverpool Master Porters and Master Stevedores, Association of: Chairman, Henry E. Wright; Hon. Secretary, W. H. Boase: Address, 403, Tower Buildings, Liverpool.

Liverpool Navy League: President, The Rt. Hon. the Earl of Derby, K.G.; Chairman, Sir Alfred Read; Hon. Secretary, Miss Manning; Telephone, Central 3887: Address, Tower Building, Liverpool.

Liverpool and Glasgow Salvage Association: Chairman, N. B. Barnes; General Manager and Secretary, B. C. Kinghorn, M.B.E.; Asst. Secretary, G. R. Critchley, M.B.E.: Address, 19, 20, and 21, Exchange Buildings, Liverpool.

Liverpool Shipowners' Association: Chairman, R. R. Clarke; Secretaries, Weightman, Pedder & Co.; Telegrams, "Weightman, Liverpool": Address, Barclay's Bank Building, Water Street, Liverpool.

Liverpool Shipping and Forwarding Agents' Association (Inc.): President, David Jones, J.P.; Chairman, J. Mitchell-Jones; Secretary, S. L. Jude; Telephone, Bank 485; Telegrams, "Impartial, Liverpool"; Address, 20, Redcross Street, Liverpool.

Liverpool Steam Ship Owners' Association: Chairman, S. J. Lister; Secretary, Martin Hill; Asst. Secretary, Vivian B. Heyne; Telephones, Central 1446 (3 lines); Telegrams, "Grayhill, Liverpool": Address, 10, Water Street, Liverpool.

Liverpool Underwriters' Association (Inc.): Chairman, H. H. Stitt; Deputy Chairman, E. S. Lund; Secretary, C. H. Penn: Address, Exchange Buildings, Liverpool.

Lloyds': Chairman, Percy G. Mackinnon; Deputy Chairman, Ernest E. Adams: Telephone, Central 8746; Telegrams, "Lloyds, London": Address, Royal Exchange, London, E.C. 3.

Lloyd's Register of Shipping: Chairman, Sir Thomas J. Storey, K.B.E.; Deputy Chairman and Treasurer, Sir George S. Higgins, C.B.E.; Chief Ship Surveyor, J. Montgomerie, D.Sc.; Chief Engineer Surveyor, H. Ruck-Keene, M.Inst.C.E.; Secretary, Andrew Scott; Telephones, Royal 811–3; Telegrams, "Committee, Fen, London": Address, 71, Fenchurch Street, London, E.C. 3.

London and District Employers' Association of Boiler Cleaners and Ship Scrapers: Chairman, John Weir; Secretary, E. H. McGuire: Address, 1, Lloyd's Avenue, London, E.C. 3.

London and District Welding Employers' Association: Chairman, R. S. Kennedy; Secretary, E. H. McGuire: Address, 1, Lloyd's Avenue, London, E.C. 3.

London Chamber of Commerce: President, Sir James Martin, J.P.; Secretary, A. de V. Leigh, M.B.E., M.A.; Telephone, City 1949: Address, Oxford Court, Cannon Street, E.C. 4.

London General Shipowners' Society: Chairman, L. H. Bolton; Secretary, Douglas T. Garrett; Telephone, Avenue 7084: Address, 1, Fenchurch Avenue, London, E.C. 3.

London Master Stevedores' Association: Secretary, C. F. Smith: Address, The Croft, Coolhurst Road, Crouch End, London, N. 8.

London, Port of, Registration Committee: Secretary, L. G. Bullock: Address, 6, Minories, London, E. 1.

London Short Sea Traders' Association: Chairman, D. L. Howe; Secretary, A. H. K. Aldred: Address, 21, Mincing Lane, E.C. 3.

London Steamship Owners' Mutual Insurance Association, Ltd.: Chairman, John Cory; Managers, A. Bilbrough & Co., Ltd.: Address, 23, Rood Lane, London, E.C. 3.

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London Underwriters, Institute of: Chairman, H. M. Merriman; Deputy Chairman, G. A. T. Darby; Vice-Chairman and Secretary, E. P. Hudson: Address, 1, St. Michael's House, Cornhill, London, E.C. 3.

Manchester Association of Engineers: Secretary, Tom Makemson: Address, St. John Street Chambers, Deansgate, Manchester.

Manchester Assn. of Importers and Exporters: Chairman, Harold A. Baerlein; Vice-Chairman, W. C. Bacon; Hon. Treasurer, H. C. Clanahan; Hon. Secretary, Jas. S. McConechy; Telegrams, "Overseas," Manchester; Telephone, City 4761: Address, National Buildings, St. Mary's Parsonage, Manchester.

Manchester Marine Insurance Association: Chairman, John Speers; Vice-Chairman, J. Brockbank; Secretary, Geo. Lombers; Telephone, Central 1228: Address, Parr's Bank Buildings, 3, York Street, Manchester.

Manchester Steamship Owners' Association: Chairman, J. E. Davenport; Hon. Secretary, T. Whyman; Telephone, City 2060, Manchester; Telegrams, "Whyman, Membership, Manchester": Address, 3, Cathedral Street, Manchester.

Mansion House Association on Railway and Canal Traffic: President, Major-General S. S. Long, C.B.; Secretary, Vincent Clements: Address: 96, Victoria Street. S.W. 1.

Marine Engineers' Association, Ltd.; President, D. White; Vice-President, J. F. Gross; General Secretary, D. Bramah, C.B.E.; Telephone, Hop 1053; Telegrams, "Oarless Boroh, London": Head Office, London Bridge House, London Bridge, London. S.E. 1,

Marine Society: President, The Rt. Hon. the Earl of Romney; Chairman, Captain Sir Arthur Clarke, K.B.E.; Treasurer, J. F. W. Deacon; Captain Superintendent, Commander D. O. F. Phibbs, R.N. (retd.); Secretary, Captain C. G. A. Lenny, R.N. (retd.); Telephone, Avenue 7740; Telegrams, "Hanway, Stock, London": Address, Clark's Place, Bishopsgate, London, E.C. 2.

Master Lightermen and Barge Owners (Port of London), Association of: President, Lionel G. Locket; Secretary, E. J. G. Weare: Telephone, Royal 2280: Address, 24–25, Great Tower Street, London, E.C. 3.

Mercantile Marine Office: Chief Superintendent, Commdr. P. O. Griffiths, R.D., R.N.R.; Superintendent, Pay-Commdr. E. A. Taffs, R.D., R.N.R.; Cashier, Paymaster Lieut.-Commdr. S. G. Farrell, R.N.R.; Address, Canning Place, Liverpool.

Mercantile Marine Service Association, Inc.: President, Captain J. Fortay; Vice-President, Captain W. O. Wynne; Deputy Vice-President, Captain J. A. Coverley; Hon. Treasurer, Gershom Stewart, M.P.; Secretary, Thos. Scott; Telephone, Central 690; Telegrams, "Topmast, Liverpool"; Address, Tower Building, Water Street, Liverpool. London Office, 90, Fenchurch Street, E.C. 3.

Middlesbrough District Association of Chartered Shipbrokers: President, J. W. Moore; Vice-President, J. A. Davies; Secretary, J. A. Davies: Address, Zetland Buildings, Middlesbrough.

Middlesbrough Keel and Lighter Owners' Association: Chairman, G. Eason; Secretary, J. W. Nellist: Address, Court Chambers, Albert Road, Middlesbrough.

Mining Association of Great Britain: Chairman, Evan Williams; Secretary, W. A. Lee: Address, General Buildings, Aldwych, W.C. 2.

Missions to Seamen: President, Admiral The Hon. Sir E. R. Fremantle, G.C.B.; Secretary and Treasurer, Stuart C. Knox, M.A.: Address, 11, Buckingham Street, Strand, London, W.C. 2.

Mutual Marine Underwriting Association, Ltd.: Chairman, John Denholm; Secretaries, Walter Patterson, M.B.E., J.P., and William Brash: Address, 94, Hope Street, Glasgow.

National Council of Port Labour Employers: Chairman, F. C. Allen; Secretary, Charles Cullen, M.A.: Address, Port of London Authority Building, Savage Gardens, E.C. 3.

National Federation of Iron and Steel Manufacturers: President, Benjamin Talbot; Secretary, M. S. Birkett: Address, Caxton House (East), Tothill Street, S.W. 1.

National Maritime Board. *See* British Mercantile Marine.

National Sailmaking Employers' Association: President, Wm. M. Rose; Vice-President, A. E. Nickels; Hon. Treasurer, William Douglas; Secretary, David M'Gill, Jr.: Telephone, Central 4535: Telegrams, "Sands, Glasgow": Address, 78, St. Vincent Street, Glasgow.

National Sailors' Society (Inc.): Secretary, Rev. W. Burton, D.D.: Address, 411, East India Dock Road, Poplar, E. 14.

National Union of Seamen: President, J. Havelock Wilson, C.H., C.B.E.; Treasurer, J. B. Wilson; General Secretary, E. Cathery, C.B.E.; Asst. Gen. Secretary, G. Gunning; Telephone, Hop 4006; Telegrams, "Searoving, Lamb, London": Head Office, St. George's Hall, Westminster Bridge Road, London, S.E. 1.

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Nautical Almanac Office, H.M.: Superintendent, P. H. Cowell, D.Sc., F.R.S.; Chief Assistant, B. F. Bawtree: Address, Royal Naval College, Greenwich, London. S.E. 10.

Nautical College, Pangbourne, Berkshire: Captain Superintendent, Commander A. F. G. Tracy, R.N. (retd.); Managers, Devitt and Moore's Ocean Training Ships, Ltd., 84, Leadenhall Street, London, E.C. 3.

Navy League: President, The Marquis of Linlithgow, O.B.E.; Chairman, Sir Cyril S. Cobb, K.B.E., M.V.O., M.P.; Gen. Secretary, Comdr. H. M. Denny, D.S.O., R.N.; Telephone, Vic. 8586: Address, 13, Victoria Street, London, S.W. 1.

Neptune Steamship Protecting and Indemnity Assn.: Chairman, S. Marshall; Secretary, George S. Coatsworth: Address, 56, John Street, Sunderland.

Newcastle Protection and Indemnity Association: Chairman, Sir William J. Noble, Bt.; Manager, Martin Fryer: Address, 4, Queen Street, Newcastle-on-Tyne.

Newport Shipowners' Association: Chairman, J. E. Dunn; Secretary, J. A. Evans: Address, 86, Dock Street, Newport, Mon.

North-East Coast Engineering Trades Employers' Association: Secretary, James Cameron: Address, Bolbec Hall, Westgate Road, Newcastle-on-Tyne.

North-East Coast Shiprepairers' Association: Secretary, James Cameron: Address, Bolbec Hall, Westgate Road, Newcastle-on-Tyne.

North of England Protecting and Indemnity Association: Chairman, Sir William H. Seager, D.L.; Vice-Chairman, Sir Arthur M. Sutherland, Bt., K.B.E.; Managers, J. Stanley Todd and Frederick Miller; Assistant Manager, S. M. Todd; Telephones, Central 5221–2–3; Telegrams, "Norprindem, Newcastle": Head Office, 32, Collingwood Buildings, Newcastle-on-Tyne.

North of England Steamship Owners' Association: President, His Grace the Duke of Northumberland, K.G.; Chairman, W. B. Nisbet; Treasurer, J. T. Lunn; Secretary, William T. Todd; Telephone, Central 1270; Telegrams, "Nemesis, Newcastle-on-Tyne": Address, 20, Collingwood Buildings, Newcastle-on-Tyne.

Port of London Authority: Chairman, Rt. Hon. Lord Ritchie of Dundee; Vice-Chairman, C. F. Leach; Secretary, F. Ayliffe: Address, Tower Hill, E.C. 3.

Register and Record Office of Shipping and Seamen. *See* General Register and Record Office of Shipping and Seamen.

Registry of Business Names: Registrar, C. C. Gallagher; Assistant Registrar, F. N. Whittle: Address, N. E. Wing, Somerset House, Strand, London, W.C. 2.

River Thames Dry Dock Proprietors' and Shiprepairers' Association: Chairman, R. H. Green; Secretary, E. H. McGuire: Address, 1, Lloyd's Avenue, E.C. 3.

Royal Corps of Naval Constructors: Director of Naval Construction, Sir W. J. Berry, K.C.B.; Director of Warship Production, E. A. J. Pearce, C.B.E.; Deputy Director of Naval Construction, C. F. Munday, C.B.; Assistant Directors, E. L. Attwood, O.B.E., W. H. Carter and A. W. Johns, C.B.E.: Address, Department of Naval Construction, The Admiralty, Whitehall, London, S.W. 1.

Royal Merchant Seamen's Orphanage: President, H.R.H. The Prince of Wales, K.G.; Chairman, R. J. Leslie; Deputy Chairman, J. Herbert Scrutton; Treasurer, The Viscount Inchcape of Strathnaver, G.C.M.G., G.C.S.I., K.C.I.E.; Secretary, F. W. Rawlinson, C.B.E.: Address, Dixon House, Lloyd's Avenue, London, E.C. 3.

Royal National Lifeboat Institution: President, H.R.H. The Prince of Wales, K.G.; Chairman, Sir Godfrey Baring, Bt.; Deputy Chairman, The Hon. George Colville; Secretary, G. F. Shee, M.A.; Telephone, Gerrard 2161; Telegrams, "Lifeboat Institution, London": Address, 22, Charing Cross Road, London, W.C. 2.

Royal Naval Benevolent Society: President, Admiral of the Fleet Lord Walter T. Kerr, G.C.B.; Secretary, Paymastier Commdr. E. W. C. Thring, C.B., R.N.: Address, 18, Adam Street, Adelphi, London, W.C. 2.

Royal United Service Institution: President, Field-Marshal H.R.H. The Duke of Connaught and Strathearn, K.G.; Chairman of the Council, Admiral Sir H. H. Bruce; Vice-Chairman, Field-Marshal Viscount Allenby; Secretary, Captain Altham: Address, Whitehall, London, S.W. 1.

Sailing Ship Mutual Insurance Association, Ltd.: Chairman, A. Anderson; Secretary, J. F. Plinke: Address, 49, Leadenhall Street, London, E.C. 3.

Salvage Association, Inc.: Chairman, P. Hargreaves; Deputy Chairman, W. F. Thompson; Secretary, Sir Joseph Lowrey, K.B.E.; Assistant Secretaries, F. C. Sadler and A. Muir Smith; Telegrams, "Wreckage, London"; Telephone, Avenue 8034: Address, 19, Birchin Lane, London, E.C. 3.

Scottish Shipmasters' and Officers' Association: Now amalgamated with the Mercantile Marine Service Association, *q.v.*

Seamen's Hospital Society: President, Captain H.R.H. The Duke of York, K.G., G.C.V.O., R.N.; Chairman, Capt. Sir A. W. Clarke, K.B.E.; Secretary, R. E. V. Bax; Asst. Secretary, S. A. Lyon; Telephone, Greenwich 370; Address, Seamen's Hospital, Greenwich, London, S.E. 10.

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Seamen's National Insurance Society: Chairman of Management Committee, Sir Norman Hill, Bt.; Treasurer, H. Mead Taylor, C.B., Board of Trade Asst. Secretary for Finance; General Secretary, Sidney H. Godfrey: Address, 19, Leman Street, London, E. 1.

Shipbuilding Employers' Federation: President, A. J. Campbell; Secretary, Jonh S. Boyd; Assistant Secretary, A. Belch: Address, 9, Victoria Street, Westminster, London, S.W. 1.

Ship Constructors' and Shipwrights' Association: General Secretary, Alex. Wilkie, C.H., M.P.; Telephone, Central 1886; Telegrams, "Wilkie, Newcastle": Registered Offices, 8, Eldon Square, Newcastle-on-Tyne.

Shipowners' Parliamentary Committee: Chairman, Rt. Hon. Walter Runciman, P.C., LL.D., M.P.; Vice-Chairman, Sir Norman Hill, Bt.; Secretary, H. M. Cleminson: Address, 28, St. Mary Axe, London, E.C. 3.

Shipowners' Protection and Indemnity Association, Ltd.: Chairman, A. W. Daniels; Managers, John Holman and Sons: Address, 1, Lloyd's Avenue, London, E.C. 3.

Shipping Federation, Ltd.: Chairman, F. C. Allen; General Manager, Cuthbert Laws; Secretary, Michael Brett; Telephones, Avenue 6108 and 6109; Telegrams, "Traffic, Led, London": Chief Office, 52, Leadenhall Street, London, E.C. 3.

Soldiers', Sailors' and Airmen's Families' Association: Chairman, Lieut.-General The Hon. Sir Frederick W. Stopford, K.C.B., K.C.M.G., K.C.V.O.; Vice-Chairman, The Countess of March, C.B.E.; Telephone, Victoria 396; Telegrams, "Gildea, Parl., London": Head Office, 23, Queen Anne's Gate, Westminster, London, S.W. 1.

South Coast Engineering and Shipbuilding Employers' Association: President, T. Donaldson; Secretary, William Nelson: Address, South-Western Chambers, Canute Road, Southampton.

Standard Ship Owners' Mutual Freight Dead Weight, Demurrage and Defence Association, Ltd.: Chairman, Sir Frederick Lewis, Bart.; Managers, Charles Taylor and Co.; Telephone, Avenue 4021; Telegrams, "Adno, Fen, London": Address, 9, Fenchurch Avenue, London, E.C. 3.

Standard Steamship Owners' Mutual War Risks Association, Ltd.: Chairman, Sir Frederick Lewis, Bart.; Managers, Charles Taylor and Co.; Telephone, Avenue 4021; Telegrams, "Adno, Fen, London": Address, 9, Fenchurch Avenue, London, E.C. 3.

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Steamship Mutual Underwriting Association, Ltd.: Chairman, R. G. Westcott; Secretary, J. F. Plincke: Address, 49, Leadenhall Street, London, E.C. 3.

Suez, Compagnie Universelle du Canal Maritime de: Chairman, Marquis de Vogüé; Chairman of London Committee and Vice-President, The Viscount Inchcape, of Strathnaver, G.C.M.G., G.C.S.I., K.C.I.E.; Secretary, George E. Bonnet: Address, 6, Bishopsgate, London, E.C. 2.

Sunderland Shipowners' Society: President, The Earl of Durham; Chairman, Ernest F. Dix; Secretary, J. G. Rutherford: Address, 45 and 46, West Sunniside, Sunderland.

Sunderland Steamship Protecting and Indemnity Assn.: Chairman, F. Walford C. Common; Secretary, J. G. Rutherford: Address, 45 and 46, West Sunniside, Sunderland.

Swansea Chamber of Commerce (Inc.): President, W. H. Thomas; Chairman, W. G. Mendus; Secretary, Henry J. Marshall; Telephone, 2818; Telegrams, "Commerce, Swansea": Address, Chamber of Commerce, Swansea.

Tees and Hartlepool Shipbuilders' Association: Chairman, F. C. Pyman; Secretary, Allan Kennedy: Address, "Kinnoull," Dovecot Street, Stockton-on-Tees.

Tees District and Whitby Shipowners' Assn.: Chairman, Sir John Harrowing; Secretary, B. O. Davies: Address, Middlesbrough.

Thames Estuary and Coast Sailing Barge Mutual Insurance and Protection Association, Ltd.: Chairman, E. A. Hibbs; Secretary, J. F. Plincke: Address, 49, Leadenhall Street, London, E.C. 3.

Thames Nautical Training College: Chairman, The Viscount Inchcape of Strathnaver, G.C.M.G., G.S.C.I., K.C.I.E.; Captain Superintendent, Captain M. B. Sayer, C.B.E., R.D., R.N.R.; Head Master, C. E. Dall, B.Sc.; Secretary, F. H. Stafford: Address, 72, Mark Lane, London, E.C. 3.

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Timber Trade Federation of the U.K.: President, Charles Gane, J.P.; Secretary, A. M. McVey; Telephone, City 1949: Address, Oxford Court, Cannon Street, E.C. 4.

Trade Facilities Act Advisory Committee: Telephone, City 3151: Address, 8, Princes Street, London, E.C. 2.

Trinity House, Honourable Corporation of: Master, Field-Marshal H.R.H. The Duke of Connaught, K.G.; Deputy-Master, Vice-Admiral G. R. Mansell, C.B.E., M.V.O.; Secretary, M. K. Smith, O.B.E.: Address, Tower Hill, London, E.C. 3.

Tyne Shipbuilders' Association: Secretary, James Cameron: Address, Bolbec Hall, Westgate Road, Newcastle-on-Tyne.

United Kingdom Mutual Steamship Assurance Association, Ltd.: Chairman, Sir Walter Runciman, Bt.; Managers, T. R. Miller & Son; Telephone, Avenue 2552; Telegrams, "Mutuality, Stock, London": Address, 24, St. Mary Axe, London, E.C. 3.

United States Shipping Board Emergency Fleet Corporation, European Division: Director for Europe, Captain P. C. Grening: London Address, Bush House, Aldwych, W.C. 2; Telephone, Central 7750–6.

Wear Shipbuilders' Association: Chairman, T. S. Short; Secretary, F. J. Carlyle: Address, Midland Bank Chambers, St. Thomas Street, Sunderland.

West of England Light Shipbuilders' Association: President, James Crichton; Secretary, J. A. S. Hassal: Address, 6, Lord Street, Liverpool.

West of England Mutual War Risks Association, Ltd.: Managers, John Holman and Sons: Address, 1, Lloyd's Avenue, London, E.C. 3.

West of England Steamship Owners' Protection and Indemnity Association, Ltd.: Chairman, Daniel Radcliffe; Deputy-Chairman, G. Dodd; Managers, John Holman & Sons: Address, 1, Lloyd's Avenue London, E.C. 3.

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COLONIAL AND FOREIGN SHIPPING ASSOCIATIONS.

AUSTRALIA.

Australasian Steamship Owners' Federation: Chairman, W. T. Appleton; Secretary, H. M. Adams: Address, Steamship Buildings, 509, Collins Street, Melbourne.
Merchant Service Guild of Australasia: Secretary, W. G. Lawrence: Address, 79–81, Pitt Street, Sydney, N.S.W.
United Service Institution of New South Wales: Secretary, Lieut. Frederick Daniell: Address, 12–14, O'Connell Street, Sydney, N.S.W.

BELGIUM.

Antwerp Chamber of Commerce: Address, Local de la Bourse, Antwerp.
Antwerp Ship Repairers' Federation: Chairman, David Petrie; Secretary, Willy M. Speleers: Address, General Buildings, 14, Place de Meir, Antwerp.
Comité Maritime International: President, His Excellency Louis Franck; Secretary, F. Sohr: Address, 34, Place Verte, Antwerp.
Fédération Maritime: Address, Courte rue des Claires 2, Antwerp.
International Shipping Federation, Ltd. (Belgian Branch): General Secretary, J. F. Drory: Address, 7, Quai Van Dyck, Antwerp.
Union des Armateurs Belges: President, Léon Dens, O.B.E.; Manager, A. de Bosschere; Hon. Secretary, Emile Deckers: Address, 59, Meir, Antwerp.

CANADA.

American Association of Port Authorities: Address, Montreal.
Shipping Federation of Canada (Inc.): President, R. W. Reford: Address, 218, Board of Trade Building, Montreal.

CHINA.

China Coastwise Association: Address, Hong Kong.

DENMARK.

Assuranceforeningen Skuld. (Danish Branch): Address, Amaliegade 29A, Copenhagen.
Baltic and International Maritime Conference: Hon. President, Mr. John Denholm, Greenock; Manager, Jacob Olsen: Address, 35, Amaliegade, Copenhagen, K.
Dansk Dampskibsrederiforening (Danish Steamship Owners' Association): President, A. O. Andersen; Managing Director, E. Maegaard: Address, Amaliegade 29A, Copenhagen.
International Shipping Federation, Ltd. (Danish Branch): General Secretary, A. O. Andersen: Address, Amaliegade 29A, Copenhagen.

FRANCE.

Bureau des Longitudes (Publishers of the French Nautical Almanac): Address, Palais de l'Institut, 3, Rue Mazarine, Paris.
Bureau Veritas: President, C. J. Lefebvre; Managing Director, A. Berlhe de Berlhe; General Secretary, A. F. Bertrand: Address, 31, Rue Henri Rochefort, Paris (17e).
Comité Central des Armateurs de France: Chairman, J. Dal Piaz; General Secretary, Paul de Rousiers: Address, 73, Boulevard Haussmann, Paris (8e).
Compagnie Universelle du Canal Maritime de Suez: Address, 1, rue d'Astorg, Paris (8e).

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GERMANY.

Bremer Reederverein: Address, Haus Schütting, Bremen.
Germanischer Lloyd: Chairman, Prof. Carl Pagel: Address, Alsenstrasse 12, Berlin, N.W. 40.
International Shipping Federation, Ltd., The, (German Branch); General Secretary, Dr. Paul Ehlers: Address, Adolphsbrücke 9, Hamburg.
Reederverein für den Bezirk der Handelskammer zu Flensburg: Address, Flensburg.
Reedereiverein zu Lübeck: Address, Breitestrasse 6, Lübeck.
Rostocker Reederverein: Address, Rostock.
Schutzverein Deutscher Reeder (Protection Association of German Shipowners): Chairman, H. M. Gehrekens; Manager, J. L. Bartelsen: Address, Alsterstrasse 1, Hamburg 1.
Verband Deutscher Reeder: President, Count von Roedern; General Manager, Dr. iur. Hans Rehmke: Address, Beim Alten Rathaus, Patriotisches, Gebaude, VI Stock, Hamburg II.
Verein Hamburger Reeder: Address, Mönckebergstrasse 27 II, Hamburg.
Verein Stettiner Reeder: Address, Börse, Stettin.

HOLLAND.

Bond van Werkgevers in de Koopvaardy (Union of Employers in the Merchant Marine): Address, Rotterdam.
Centrale van Koopvardy-officierin (Central Union of Merchant Marine Officers): Address, Rotterdam.
International Shipping Federation, Ltd. (Dutch Branch): Secretary, J. Stakenburg: Address, Parklaan 8, Rotterdam.
Nederlandsche Reedersvereeniging: President, J. B. van der Houven van Oordt; Secretary, G. L. Heeris: Address, Stationsweg 135, The Hague.
Scheepvaart Vereeniging "Nord" ("North" Shipping Association): Address, Amsterdam.
Scheepvaart Vereeniging "Zuid" ("South" Shipping Association): Address, Rotterdam.

INDIA.

United Service Institution of India: Address, Simla.

ITALY.

Federazione Armatori Italiani: Secretary, Comm. Avv. V. Giulio Perosio: Address, Via XX Septembre 19–4, Genoa.
Federazione Fascista degli Armatori di Navi da Casico del Tirreno: President, Avv. G. B. Becchi; Secretary, Avv. Guiseppe Sciaccaluga: Address, Salita S. Caterina 4, Genoa (6).
Registro Italiano: Director, Comm. Ing. D. Barricelli; President, Board of Administration, Amm. Quivanni Sechi; Secretary, Ing. C. Doerfles: Address, Piazza della Borsa 7, Trieste.

JAPAN.

Japanese Merchant Marine Officers' and Engineers' Association; Secretary, Yojiro Tsudzuki: Address, No. 180, 8 Chome, Shimoyamate—Dori, Kobe.
Nippon Shipowners' Association: President, K. Hori; Managing Director, Z. Kamiya: Address, 32, Akashi Machi, Kobe.
Teikoku Kaiji Kyokai (Imperial Japanese Marine Corporation): Chairman, Baron Dr. C. Shiba; Secretary, S. Shinohara: Address, 444, Kaijo Building, Marunuochi, Tokio.

NORWAY.

Assuranceforeningen Skuld.: President, Otto Thoresen; Managing Directors, Sir Anton Poulsson, K.B.E., and Einar Poulsson: Address, Carl Johansgate 1, Postbox 129, Oslo.
Det Norske Veritas: Chairman, Aksel Irgens; Secretary, N. Hagness: Address, P.O. Box 82, Oslo.
Nordisk Skibsrederforening: President, A. F. Klaveness; Managing Director, J. Jantzen: Address, Drammensveien 21, Oslo.
Norges Rederforbund: President, H. Westfal-Larsen: Address, Stortingsgaten 16, Oslo.
Skibsbyggerienes Landsforening: Address, Schestedsgt 3 Oslo.

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SPAIN.

"Almanaque Nautico" (The Spanish Nautical Almanac). *See* Observatorio de Marina.

Asociaciòn de Navieros de Bilbao: President, Sir Ramón de la Sota, K.B.E.; Secretary, Don Antonio Arroyo: Address, Ibañez de Bilbao 22, Bilbao.

Observatorio de Marina (Publishers of the Spanish "Almanaque Nautico"); Director, Señor Leon Herrero: Address, San Fernando, Cadiz.

SWEDEN.

International Shipping Federation, Ltd. (Swedish Branch): General Secretary, O. A. Nordborg: Address, Sveriges Redareförening, Kungsportsavenyen 1, Gothenburg.

Svenska Teknologföreningen adv. för Skeppsbyggnadskonst (Association of Swedish Engineers and Architects—Section for Naval Architecture): Address, Stockholm 16.

Sveriges Allmänna Sjöfartsförening (Swedish General Shipping Association): President, Hans Ericson; Secretary, C. E. Landberg: Address, Bergviks Uvägen 57, Appelviken, Stockholm.

Sveriges Angfartygs Assurans Förening: Address, Gothenburg.

Sveriges Redareförening (Swedish Shipowners' Association): President, Gunnar Carlsson; Managing Director, O. A. Nordborg: Address, Kungsportsavenyen 1, Gothenburg.

Sveriges Segelfartygsförening: Manager, Paul L. Nilsson: Address, Ombudsmannen, Helsingborg.

UNITED STATES.

American Association of Port Authorities: President, J. Spencer Smith; Secretary, Tiley S. McChesney: Address, Room 200, New Orleans Court Building, New Orleans, Louisiana.

American Bureau of Shipping: President, C. A. McAllister; Secretary, J. W. Cantillion: Address, Stevenson Taylor Memorial Building, 24–46, Old Slip, New York.

American Manufacturers' Export Association: Secretary, M. B. Dean: Address, 160, Broadway, New York City.

American Marine Association: President, Colonel E. A. Simmons; Vice-President, Capt. C. A. McAllister; Secretary-Treasurer, Henry C. Hunter: Address, 30, Church Street, New York, N.Y.

American Steamship Owners' Association: President, H. B. Walker; First Vice-President, William Newsome; Secretary, R. J. Baker: Address, 11, Broadway, New York.

American Steamship Owners' Mutual Protection and Indemnity Association (Inc.): Chairman, Joseph D. Tomlinson; Secretary, J. H. de G. Evans: Address, 104, Pearl Street, New York, N.Y.

Maritime Association of the Boston Chamber of Commerce: Chairman, Edward E. Blodgett; Manager, Frank S. Davis: Address, 177, Milk Street, Boston 9, Mass.

Master Boiler Makers' Association: Secretary, H. D. Vought: Address, 26, Cortlandt Street, New York City.

National Association of Engine and Boat Manufacturers: Secretary, R. R. Hand: Address, 29, West 39th Street, New York.

National Merchant Marine Association: President, Hon. Joseph E. Ransdell; Secretary, Mr. Henry C. Wiltbank: Address, Munsey Building, Washington, D.C.

National Rivers and Harbours Congress: Secretary, S. A. Thompson: Address, 824, Colorado Building, Washington, D.C.

Nautical Almanac: Director of the Almanac, Captain W. S. Eichelberger (Math), U.S.N.: Address, United States Naval Observatory, Washington, D.C.

Pacific American Steamship Association: President, Captain Robert Dollar; Secretary, J. P. Williams: Address, 336, Battery Street, San Francisco, California.

Port of New York Authority: Secretary, Wm. Leary: Address, 11, Broadway, New York.

Shipowners' Association of the Pacific Coast: President, F. J. O'Connor: Secretary, Nat Levin: Address, 336, Battery Street, San Francisco, California.

United States Shipping Board Emergency Fleet Corporation: Address, Washington, D.C.

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THE STEAMSHIP SERVICES OF THE WORLD.

All lines run return journeys in reverse order to services given, except where otherwise stated.

***** Shipowners are requested to forward particulars of their Services for inclusion in this Section. No charge is made for insertion. Details should be addressed: The Editor, "Brassey's Naval and Shipping Annual," c/o Messrs. William Clowes and Sons, Ltd., 94, Jermyn Street, London, S.W.1.**

AFRICA, EAST.

British India Line; from London and Middlesbrough to Principal Ports of East Africa (*passengers and cargo*); from Bombay to Mombasa, Zanzibar, Dar-es-Salaam, Beira, Delagoa Bay (*mails, passengers and cargo*).

Clan Line; from Glasgow, Liverpool and Newport to Natal, Delagoa Bay, Beira, Mauritius, Madagascar (*cargo*).

Compagnie Havraise Péninsulaire de Navigation à Vapeur; from Havre and Marseilles to Madagascar (East Coast), Réunion and Maurice Isle (*passengers and cargo*); from Havre, Bordeaux, and Marseilles to Madagascar (West Coast) and Mozambique (*passengers and cargo*).

Deutsche Ost-Afrika Linie; from Hamburg, Antwerp, and Southampton to Chief East African Ports (*passengers and cargo*).

Hall Line; from Glasgow and Liverpool to all East African Ports (*passengers and cargo*).

Hamburg-Amerika Linie Africa-Dienst; from Hamburg, Antwerp, and Southampton to Chief Ports of East Africa (*passengers and cargo*).

Hamburg-Bremer-Afrika Linie A.G.; from Hamburg, Antwerp, and Southampton to Chief East African Ports (*passengers and cargo*).

Harrison Line; from Glasgow and Birkenhead to Principal Ports of East Africa (*cargo*).

Holland Africa Line; (Combined Service) to all Principal Ports (*cargo and passengers, limited*).

Houlder Brothers and Co., Ltd.; from London to Chief East African Ports (*passengers and cargo*).

Houston Line; from Continent, Middlesbrough, London, Glasgow, Liverpool, and United States to Chief East African Ports (*cargo*).

Prince Line; from New York to Delagoa Bay, Beira, etc. (*cargo*) (*vid* Cape).

Prince Line; from New York to East African Ports, and vice versâ (*cargo*).

Union-Castle Line; from Southampton to Madeira, Capetown, Port Elizabeth, East London and Natal (without transhipment); also for Delagoa Bay and Beira (*passengers, mails and cargo*).

Woermann-Linie, Aktien-Gesellschaft; from Hamburg, Antwerp, and Southampton to Chief East African Ports (*passengers and cargo*).

AFRICA, SOUTH.

Aberdeen Line; from Liverpool to Cape Town (*passengers only*) to South Africa.

Blue Funnel Line. *See* Holt and Co., Alfred, Liverpool.

British India Line; from Bombay to Durban (*passengers, mails, and cargo*).

Clan Line; from Glasgow, Liverpool and Newport to Cape Town, Algoa Bay, East London and Durban (*cargo*).

Deutsche Ost-Afrika Linie; from Hamburg, Rotterdam, and Southampton to Chief South African Ports (*passengers and cargo*).

Ellerman and Bucknall Steamship Co., Ltd.; from United Kingdom (*weekly cargo services, also regular passenger service*); from Australia (*fortnightly cargo sailings*); from New York (*joint weekly cargo sailings*).

Furness, Withy and Co., Ltd. *See* Prince Line.

Hall Line; from Glasgow and Liverpool to Cape Town, Mossel Bay, Algoa Bay, East London, Natal, Delagoa Bay, and Mauritius (*cargo*).

Hamburg-Amerika Linie Africa-Dienst; from Hamburg, Rotterdam, and Southampton to South African Ports (*cargo and passengers*).

Hamburg-Amerika Linie (Afrika-Dienst); from Hamburg, Antwerp and Southampton to Chief West African Ports (*passengers and cargo*).

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Hamburg-Bremer-Afrika Linie A.G.; from Hamburg, Bremer, Rotterdam, and Southampton to Chief South African Ports (*passengers and cargo*).
Harrison Line; from Birkenhead, Glasgow, and Newport to Capetown, Mossel Bay, Algoa Bay, East London, Natal, Delagoa Bay, Beira, and Mauritius (*cargo*).
Harrison Line; London and Middlesbrough to Natal, Delagoa Bay, and Beira.
Holland Africa Line; from Hamburg, Antwerp, Amsterdam, Rotterdam, to all Principal Ports (*cargo and passengers, limit d*).
Holt and Co., Alfred, Liverpool; from Liverpool to Cape Town (*passengers*); homewards from Durban and Cape Town to Liverpool and Glasgow (*passengers and cargo*).
Houlder Brothers and Co., Ltd.; from London to Cape Town, Port Elizabeth, East London, Durban, Delagoa Bay and Beira (*passengers and cargo*).
Houston Lines; from United Kingdom and from United States (*both cargo services, carrying a few passengers*).
Natal Line of Steamers, Bullard, King & Co., Ltd.; from London, Middlesbro' and Continent to South Africa; also service between Calcutta, Rangoon and Colombo and South and East African Ports (*passengers and cargo*).
Peninsular and Oriental Service to Australia; from London to Adelaide, Melbourne, and Sydney *vid* Cape Town (*passengers, one class only, mails and cargo*).
Prince Line; from New York to South African Ports, and vice versâ (*cargo*).
Shaw, Savill and Albion Co., Ltd.; from London to Australia, *vid* the Cape of Good Hope (outwards, *general cargo;* homewards, *a large amount of meat and dairy produce in cold storage*).
Union-Castle Line; from London and Plymouth to Canary Islands, Cape Town, Mossel Bay, Port Elizabeth, East London, Natal, Delagoa Bay and Beira (without transhipment); also for Inhambane, Chinde, Quelimane, Macuse, Moma and Angoche (*passengers, mails, and cargo*).
Wilh. Wilhelmsen; from Norway, Sweden, Denmark, and Finland, to chief South African Ports (*cargo*).
White Star Line; from Liverpool to Australia, calling at Cape Town (*passengers and cargo*).
Woermann-Linie, Aktien Gesellschaft; from Hamburg, Rotterdam, and Southampton to Chief South African Ports (*passengers and cargo*).

AFRICA, WEST.

African Steamship Co.; from Liverpool and London to principal West African Ports (*passengers and cargo*).
British and African Steam Navigation Co., Ltd.; from Liverpool and Rotterdam to principal West African Ports (*passengers and cargo*).
Deutsche Ost-Afrika Linie; from Hamburg, Rotterdam, Antwerp, and Southampton to Chief West African Ports (*passengers and cargo*).
Elder Dempster and Co., Ltd.; from Liverpool, London, Hamburg, Rotterdam, Antwerp, New York, Montreal (ships load homewards to Montreal if inducement offers) to West African Ports; also West African Ports to Hull (*passengers and cargo*).
Hamburg-Bremer-Afrika Linie A.G.; from Hamburg, Rotterdam, Antwerp, and Southampton to Chief West African Ports (*passengers and cargo*).
Holland West Africa Line; from Hamburg, Amsterdam, Bordeaux, Antwerp with Trans. to Principal Ports (*cargo and passengers, limited*).
Houston Lines; from London, Glasgow, and Liverpool (*cargo*).
Union-Castle Line; from London to Lobito Bay, Walfish Bay, and Luderitz Bay; Port Elizabeth, East London and Natal to Mauritius.

AMERICA, CENTRAL.

Canadian Government Merchant Marine, Ltd.; Montreal to Nassau, Kingston (Ja.) Jamaica and Belsize (B.H.) (*passengers and cargo*); Montreal to Barbados, Trinidad, and British Guiana (*cargo*). During the winter these services operate from Halifax, N.S.
Canadian Government Merchant Marine, Ltd.; St. John (N.B.) and Halifax (N.S.) to Bermuda, St. Kitts, Antigua, Montserrat, Dominica, St. Lucia, Barbados, St. Vincent, Grenada, Trinidad and Demerara (*cargo*).
Clyde Steamship Co.; from New York to Santo Domingo City and Azua, *vid* Turks Island, calling at Monte Cristo, Puerto Plata, Samana, Sanchez, La Romana, and Macoris (*passengers and cargo*).

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Compagnie Générale Transatlantique; Havre to Central American Ports (*cargo*).
Cuban Line (Ernest Bigland and Co., Ltd., Managers); from Antwerp, Hull, and London to Cuba and Mexico (*cargo and few passengers*).
Elders and Fyffes, Ltd.; from Avonmouth, Garston, and Rotterdam to Bermuda, Jamaica, Barbadoes, Trinidad, St. Simon, Panama, Spanish Honduras, and Colombia (*passengers only*).
Ellerman and Buknall Steamship Co., Ltd.: Calcutta, and Rangoon to West Indies and Cuba (*regular joint service*).
Furness Line; from New York to Bermuda (*passengers and cargo*); New York to West Indies (*passengers and cargo*); from New York to Grenada, Trinidad and Demerara (*passengers and cargo*); from Glasgow and Manchester to Colon and Balboa, proceeding thence to Los Angeles, San Francisco, Victoria and Vancouver (*passengers and cargo*).
Furness, Withy and Co., Ltd. *See* Furness Line.
Holland America Line; from Antwerp, Rotterdam to Havana, Vera Cruz, Tampico and Orleans.
Hamburg-Amerika Line; from Hamburg to Cuba and Mexico (*passengers and cargo*); from Hamburg to Cuba (*freight*); from Hamburg to West Indies (*passengers and cargo*); from Hamburg to West Coast Ports and Mexico, *viâ* Panama (*passengers and cargo*); from Hamburg to the West Indies Islands (three-weekly).
Harrison Line; from Glasgow to West Indies and Demerara (*cargo*); from London to West Indies and Demerara (*passengers and cargo*); from Swansea, Glasgow, and Liverpool to North Pacific Ports, *viâ* Panama Canal (*cargo*); from Liverpool to West Indies and Mexico (*cargo*).
Holt and Co., Alfred, Liverpool; from Boston and New York to the Straits Settlements, Philippines, China, Japan, Korea, Siberia, Pacific Coast *viâ* Panama (*cargo*).
Houston Lines; from River Plate Ports to United States and Canada, calling at Cuba (*cargo service, carrying a few passengers*).
Hugo Stinnes Linien; from Hamburg to Cuba and Mexico (*passengers and cargo*).
Koninklijke West-Indische Maildienst; from Hamburg, Antwerp, Rotterdam Amsterdam to all Principal Ports in Central America, and West Coast of South-America (*passengers and cargo*).
Larrinaga Line; from Liverpool to Havanna and other Cuban Ports; from Houston and Galveston to Liverpool and Manchester.
Leyland Line; from Liverpool, London, and Manchester to Panama (*passengers and cargo*).
New York and Porto Rico Steamship Co. *See* Porto Rico Line.
New Zealand Shipping Co., Ltd.; from London and Liverpool through the Panama Canal to New Zealand and Australia (*passengers and cargo*).
Nourse Line; from Calcutta to Cuba, P. & O.
Panama Rail Road Steamship Co.; from New York, Port au Prince (Hayti), to Cristobal (Canal Zone, Panama) (*passengers and cargo*).
Porto Rico Line; from New York to San Juan, Ponce, Mayaguez, Arroyo, Aguadilla, Arecibo, etc. (*freight and passengers*); from New Orleans and Mobile to San Juan, Ponce, and Mayaguez, Arroyo, Aguadilla, Arecibo, etc. (*freight*).
Roland-Linie, Aktien Gesellschaft; from Hamburg, Bremen and Antwerp to West Indies and Central America.
Royal Mail Steam Packet Co.; from London and Hull to Bermuda, Nassau, Santiago de Cuba, Jamaica, Haiti and San Domingo; from Rotterdam, Antwerp and London to Puerto Colombia, Colon and Central American Pacific Ports (*passengers and cargo*); from Colon and Central American Pacific Ports to Glasgow, Liverpool, Southampton, London, Hamburg, Rotterdam, Antwerp; from St. John, N.B., and Halifax, N.S., to Bermuda, West Indies, and Demerara (*passengers, mails and cargo*).
Shaw, Savill and Albion Co., Ltd.; from London through the Panama Canal to New Zealand, returning by same route (*passengers and cargo*).
Stinnes Linien. *See* Hugo Stinnes Linien.
Wilh. Wilhelmsen; from Norway, Sweden, Denmark, and Finland to Cuba, Vera Cruz, and Tampico (*cargo and a few passengers*).
White Star Line, jointly with Shaw, Savill and Albion Co., Ltd.; from London to New Zealand *viâ* Panama Canal (*passengers and cargo*).

AMERICA, SOUTH.

"Artus" Line. *See* Hugo Stinnes Linien.
Booker Line; from Liverpool to Demerara (British Guiana) direct (*passengers and cargo*).

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Booth Line; from Antwerp, Hamburg, Havre, Liverpool, Lisbon, London, Madeira and Oporto to principal North Brazilian Ports, and Iquitos, Peru; also from New York to all principal Brazilian Ports (*passengers and cargo*).

British and Argentine Steam Navigation Co., Ltd.; from Liverpool to River Plate Ports (*passengers and cargo*).

Compagnie Générale Transatlantique to Pacific Coast Ports (*cargo*).

Compania Naviera Sota y Aznar (Spanish Line); from Hamburg, Rotterdam, Antwerp and Bilboa to Rio de Janeiro, Santos, Monte Video and Buenos Aires (*cargo*); also Glasgow, Liverpool and Swansea to Spanish Ports (*cargo*) (outwards only).

Cornborough Shipping Line, Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Davies Steamship Co., W. R.; from Liverpool to principal South American Ports (*cargo*).

Donaldson South American Line; from Glasgow, Liverpool, and London to Monte Video and Buenos Aires—also by transhipment to other River Plate Ports (*refrigerated cargo*).

Furness-Houlder Argentine Lines, Ltd.; from London and Liverpool to chief Ports of Argentine and Uruguay (*refrigerated cargo and a few first-class passengers*).

Furness, Withy and Co., Ltd. *See* Furness Line, Prince Line, and Furness-Houlder Argentine Lines.

Grace Lines; from New Orleans to Ports of Equador, Peru, and Chile (*passengers, cargo, and mails*).

Hall Line; from Calcutta to River Plate Ports (*cargo*).

Hamburg-Amerika Line; from Hamburg to Brazil and La Plata Ports (*passengers and cargo*); from Hamburg to West Coast Ports of South America (*viâ* Magellan, fortnightly; *viâ* Panama, every ten days).

Hamburg-Südamerikanische Dampfschifffahrts-Gesellschaft; from Hamburg to Brazil, Uruguay, and Argentina (*passengers, cargoes and mails*).

Harrison Line; Liverpool and South Wales to Brazil (*cargo*).

Henderson and Co., Ltd.; from Glasgow to principal South American Ports (*cargo*).

Holland and Co., Ltd., Arthur; from Newport to principal South American Ports (*cargo*).

Houlder Brothers and Co., Ltd.; from Antwerp, London, Liverpool, and Bristol Channel to Monte Video, Buenos Aires, and Rosario (Outwards, *general cargo and passengers*; Homewards, *frozen meat, chilled meat, dairy produce, and general cargo; and passengers*).

Houston Lines; from Glasgow and Liverpool to River Plate; from United States to River Plate; from Canada to River Plate; from West Indies to River Plate (*all cargo services, carrying a few passengers*).

Hugo Stinnes Linien; from Hamburg to Portuguese Ports, Pernambuco, Monte Video, Buenos Aires, and Rosario (in association with the "Artus" Line, Danzig) (*passengers and cargo*).

Kaye, Son and Co., Ltd.; from Liverpool to principal South American Ports (*cargo*).

Koninklijke Hollandsche Lloyd; from Amsterdam to Buenos Aires, calling *en route* at Southampton, Cherbourg, La Corunna, Vigo, Leixoes, Lisbon, Las Palmas, Pernambuco, Bahia, Rio de Janeiro, Santos, and Monte Video (*passengers, mails, and freights*); from Hamburg *viâ* Rotterdam, Antwerp, Spain to Argentina (*cargo*); from Hamburg to Amsterdam, Antwerp, Portugal to Brazil (*cargo*).

Lamport and Holt; from Liverpool, Glasgow, and Manchester to Brazil, *viâ* Portugal; from Liverpool and Glasgow to the River Plate, *viâ* Spain; from Middlesbrough, Hamburg, Antwerp, London, and Cardiff to Brazil and the River Plate; from New York to North Brazil; from New York to Central and South Brazil; from New York to River Plate Ports; from New Orleans to Brazil and River Plate; from Glasgow, Liverpool, and Havre to the West Coast Ports of South America (*cargo*); from New York to Brazil and the River Plate, calling at the West Indies (*passengers*).

Leeds Shipping Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

MacIver Line; from Liverpool to principal River Plate Ports without transhipment (*cargo*).

Nelson, Ltd., H. and W.; from London to Buenos Aires, calling on the outward journey at Boulogne, Corunna, Vigo, Las Palmas, G.C., Rio de Janeiro, and Monte Video, and on the homeward journey at Monte Video and Las Palmas; from Liverpool to Buenos Aires, calling at Monte Video, and at Las Palmas on the homeward voyage (*cargo, passengers, and mails*).

Oakwin Steam Ship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Prince Line, Ltd.; from Middlesbrough, Antwerp and London to River Plate Ports (*cargo*), and vice versâ; from New York to River Plate Ports (*cargo*); from New York to Brazil (*cargo*), and vice versâ; from Brazil to New Orleans.

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Ritson, F. and W.; from Glasgow, Liverpool, and London to principal West Coast South American Ports (*cargo*).

Roland-Linie, Aktien Gesellschaft; from Bremen and Hamburg to Chile, Peru, and Ecuador (*passengers and cargo*).

Rotterdam South America Line; Koninklijke Hollandsche Lloyd (joint service); from Hamburg, Antwerp, Amsterdam, Rotterdam to all Principal Ports in South Amarica (*cargo "A" boats passengers*).

Rotterdam-Zuid Amerika Lijn; from Hamburg, Rotterdam, and Antwerp to Buenos Aires, Monte Video, Santos, Rio de Janeiro, Bahia, and Pernambuco, calling at Bilbao, Santander, and Vigo (*cargo, carrying a few passengers*).

Royal Mail Steam Packet Co.; from Southampton to Pernambuco, Bahia, Rio de Janeiro, Santos, Monte Video, and Buenos Aires (*mails, passengers, and cargo*); from Liverpool to Rio de Janeiro, Santos, and Buenos Aires, calling at Cherbourg, Coruna, Leixoes, and Lisbon (*mails, passengers and cargo*); from London, Newport, and Swansea to Pernambuco, Maceio, Bahia, Rio de Janeiro, Santos, Rio Grande do Sul and Paranagua (*cargo only*); from Brazil to Havre, Antwerp, Rotterdam, Hamburg and Liverpool.

St. Just Steamship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Shaw, Savill and Albion Co., Ltd.; from London to New Zealand, proceeding on the outward journey *viâ* the Panama Canal, and on the homeward journey *viâ* Cape Horn, calling at Monte Video and Teneriffe (*cargo, and meat and dairy produce in cold storage on homeward voyage*).

Sota y Aznar; from Hamburg, Rotterdam, Antwerp, and Bilbao to Pernambuco, Bahia, Rio de Janeiro, Santos, Monte Video, and Buenos Aires (*cargo*), and reverse.

Stinnes Linien. *See* Hugo Stinnes Linien.

Toyo Kisen Kaisha; from Hong Kong, Moji, Kobe, Yokohama, Honolulu, and Hilo to San Francisco, Portland, Los Angeles, Salina Cruz, Balbao, Callao, Mollendo, Arica, Iquique, and Valparaiso (*passengers and mails*).

Wilh. Wilhelmsen (Wilhelmsen Steamship Line); from New York to Brazil and River Plate Ports (*cargo and refrigerated stores—fortnightly*).

AUSTRALIA AND NEW ZEALAND.

Aberdeen Line; from Liverpool to Albany, Adelaide, Melbourne, Sydney and Brisbane; calling at Teneriffe and Cape Town (outward), and Fremantle, Durban, Cape Town and Teneriffe (homeward) (*passengers and cargo*).

Adelaide Steamship Co., Ltd.; between Queensland Ports, Sydney, Newcastle, Melbourne, Adelaide, Albany, and Fremantle (*cargo and stock*); between Port Adelaide, Spencer's Gulf, and West Coast Ports (*passengers, cargo, and stock*).

Anderson, Green and Co., Ltd. *See* Orient Line.

Australian Commonwealth Line of Steamers; from London to Fremantle, Adelaide, Melbourne, Sydney, and Brisbane *viâ* Port Said and Colombo (*passengers and cargo*); from United Kingdom Ports to Fremantle, Adelaide, Melbourne, Sydney and Brisbane *viâ* Suez Canal (*cargo*).

Australian Steamships Pty., Ltd.; between Melbourne, Sydney, Newcastle, Brisbane, Queensland Ports, Adelaide, and other South Australian Ports, Albany, Fremantle, Geraldton, and West Australian Ports, Geelong, Portarlington, Warrnambool, Portland, etc. (*passengers and cargo*).

Blue Funnel Line. *See* Holt and Co., Alfred.

British India Line; from London to Fremantle, Adelaide, Melbourne, Sydney, and Brisbane; from Gulf of Mexico to Australian and New Zealand Ports, from Calcutta to Australian Ports (*passengers and cargo*).

Burns, Philp and Co., Ltd.; between Sydney, Queensland Ports, Darwin, Java, and Singapore; between Sydney, Lord Howe Island, Norfolk Island, and New Hebrides; between Sydney, Brisbane, Solomon Islands, and New Britain; between Sydney, Queensland, Papua, and Rabaul; between Sydney and New Britain direct (*mails, passengers, and cargo*).

Canadian-Australian Line. *See* Canadian Pacific Railway Co.

Canadian Government Merchant Marine, Ltd.; from Vancouver (*cargo*); from Montreal (*cargo*). During the winter months this service operates from Halifax, N.S.

Canadian Pacific Railway Co., in conjunction with the Canadian-Australian Line; from Vancouver to Honolulu, Suva, Fiji, Auckland, N.Z., and Sydney, Australia (*passengers and cargo*).

Commonwealth and Dominion Line, Ltd.; from London, also Glasgow and Liverpool, to Auckland, Wellington, Lyttleton and Port Chalmers and/or Dunedin, N.Z., *viâ* the Panama Canal.

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Commonwealth and Dominion Line; from London, Middlesbrough, Hull, Antwerp and Hamburg to Melbourne, Sydney, Newcastle, N.S.W., Brisbane, Hobart and Launceston *viâ* the Cape of Good Hope.

Commonwealth and Dominion Line; from New York to Australia and New Zealand *viâ* the Panama Canal; Homewards from Australia and New Zealand to United Kingdom and Continent (*cargo and passengers*).

Cornborough Shipping Line, Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Cunard Line; from Southampton, Liverpool, Belfast, Glasgow, Queenstown, Cherbourg, Havre and Hamburg *viâ* U.S.A. or Canada to all the chief Ports of Australia and New Zealand (*passengers*).

Eastern and Australian Steamship Co., Ltd.; Melbourne, Sydney, Brisbane and Queensland Ports to Borneo, Manila, Hongkong and Japanese Ports (*passengers and cargo*).

Ellerman and Bucknall Steamship Co., Ltd.; to London, United Kingdom and Continent, also United States (*regular cargo services*); from New York (*frequent joint cargo services*).

Federal Steam Navigation Co., Ltd.; from London and West Coast Ports of Great Britain to Principal Ports of Australia (*passengers and cargo*).

Hall Line; from Liverpool to principal Australian Ports (*passengers and cargo*).

Henderson and Co., Ltd.; from Glasgow and Liverpool to principal Australian Ports (*cargo*).

Holt and Co., Alfred; from Glasgow and Liverpool and from Hamburg, Bremen, Rotterdam and Antwerp to Western Australia, Adelaide, Melbourne, Sydney and Brisbane; from Singapore to West Australian Ports (*passengers and cargo*).

Leeds Shipping Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Liverpool Line to Australia; from Liverpool to Fremantle, Adelaide, Melbourne, Sydney, Newcastle, Brisbane, Auckland, Wellington, Lyttelton and Dunedin; from Manchester to same ports (*passengers and cargo*). Marwood and Robertson, 33, Brazennose Street, Manchester, and 18, Water Street, Liverpool.

London Line; from Bristol, Glasgow, Liverpool, and London to principal Australian Ports (*passengers and cargo*).

McIlwraith, McEacharn's Line; from Sydney to Melbourne, Adelaide, Albany, and Fremantle (*passengers and cargo*).

New Zealand Shipping Co., Ltd., from London and West Coast ports of Great Britain, *viâ* the Panama Canal, to principal Australian and New Zealand Ports (*mails, passengers, and cargo*).

Oakwin Steamship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Orient Line to Australia; from Tilbury to Fremantle, Adelaide, Melbourne, Sydney, and Brisbane, calling at Gibraltar, Toulon, Naples, Port Said, and Colombo, also on the return journey at Plymouth. At certain seasons of the year the vessels call at Hobart, Tasmania (*passengers, cargo, and mails for Commonwealth of Australia*).

Peninsular and Oriental Service to Australia; from London to Adelaide, Melbourne, and Sydney, *viâ* Cape Town (*passengers—one class only—mails and cargo*).

Peninsular and Oriental Steam Navigation Company; fortnightly service from London to Fremantle, Adelaide, Melbourne, and Sydney, calling at Gibraltar, Marseilles and Port Said, or Port Said and Port Sudan, Aden, and Colombo, and homewards also at Plymouth (*passengers, mails, and cargo*).

St. Just Steamship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Shaw, Savill and Albion Co.; from Glasgow and Liverpool to Port Chalmers *viâ* Panama Canal, calling at Auckland, Wellington, and Lyttleton (*passengers, mails, and cargo*); from London to New Zealand, proceeding *viâ* the Panama Canal, and on the return journey *viâ* Cape Horn, calling at Monte Video and Teneriffe en route (*cargo*).

Shire Line; from Glasgow to principal Australian Ports (*cargo*).

Trinder, Anderson and Co.; from London to principal Australian Ports (*cargo*).

Turnbull, Martin and Co.; from London and West Ports of Great Britain to principal Australian and New Zealand Ports (*passengers and cargo*).

White Star Line; from Liverpool to Sydney, calling at Cape Town, Albany, Adelaide, and Melbourne (*passengers and cargo*); from Liverpool to Australia, direct (*cargo*); from Liverpool to New Zealand, direct (*cargo*), jointly with Shaw, Savill and Albion Co., Ltd.; from London to Port Chalmers *viâ* the Panama Canal, calling at Auckland, Wellington, and Lyttleton (*passengers, mails, and cargo*).

Wilh. Wilhelmsen: from Norway, Sweden, Denmark, Finland, Hamburg, and Antwerp to principal Australian Ports (*cargo*).

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BALTIC AND NORTH SEA.

American-Hawaiian Steamship Co.; from Los Angeles, Portland, San Francisco, Seattle, and Tacoma to Hamburg, calling at Glasgow, Havre, Liverpool, and London (*fortnightly cargo sailings*).

Bachke and Co; from Hull, Trondhjem and West Norwegian Ports to Aberdeen, Grangemouth, Hull, Grimsby, London, Manchester, Bristol, Swansea, Bremen, Antwerp and French Ports (*cargo*).

Becker and Co., Ltd.; from East and West Coast Ports of the United Kingdom to principal Baltic Ports (*passengers and cargo*).

Bergenske Dampskibselsskab, Det.; from Glasgow, Manchester, Middlesbrough and Newcastle to Principal Ports of Norway and Sweden (*passengers and cargo*).

Bergenske Dampskibsselskab, Det. (B. & N. Line); from Newcastle to Bergen four times weekly (summer), three times weekly (winter). Quickest route Scandinavia—England (*passengers and cargo*). Cargo steamers from London, Glasgow, Manchester, Middlesbrough, etc., to Principal Ports of Norway, regularly. Regular steamers Rotterdam—Bergen, Hamburg—Bergen, weekly. Bergen—Farö Islands and Iceland, fortnightly. Express Coastal steamers Bergen—Kirkenes (*passengers and cargo*).

Brodin, Erik; from London to Principal Ports of Norway and Sweden (*passengers and cargo*).

Burton, Smart and Orford, Ltd. *See* Scandia Lines.

Cook and Son, John; East Norway to Aberdeen, Dundee and Granton (*cargo*).

Cormack and Co., James; from Aberdeen, Dundee, Grangemouth, Leith, Montrose, and Methil to Riga, Windau and other Latvian Ports; occasional steamers to Archangel (*cargo and few passengers*).

Compagnie Générale Transatlantique: Havre to Memel and Dantzig (*passengers and cargo*).

Cornborough Shipping Line, Ltd. *See* Smith and Sons, Ltd., Sir Wm Reardon.

Currie Line. *See* Leith, Hull and Hamburg Steam Packet Co.

Ellerman's Wilson Line; from Grimsby, Hull, Liverpool, London, Newcastle and Swansea to Principal Ports of Baltic, Norway, and Sweden.

Finland Line; from Liverpool to Helsingfors (*cargo*).

Finland Steamship Co., Ltd. *See* Finska Ångfartygs Aktiebolaget.

Finska Ångfartygs Aktiebolaget; from Hull to Copenhagen and Finnish Ports (*passengers and cargo*); from Antwerp to Finnish Ports (*passengers and cargo*); from Stettin and Lübeck to Helsingfors and Finnish Ports (*passengers and cargo*); from Stockholm to Helsingfors and Abo (*passengers and cargo*); from Dantzig, Riga and Reval to Helsingfors or Hangö (*passengers and cargo*). The foregoing lines carry mails for Germany, Sweden, and Esthonia. From Hull, London, Liverpool, and Manchester, Leith, Grangemouth to Finnish Ports (*cargo*); from Rotterdam, Antwerp, Northern France, and Copenhagen to Finnish Ports (*cargo*). From Marseille, Geneva and Spanish Ports to Finnish Ports (*cargo*). From Lubeck to Finnish Ports (*cargo*).

Forenede Dampskibsselskab., Det.; from Hull, London, Manchester, Swansea Liverpool, Newcastle, Leith, Grimsby and Harwich to Ports of Scandinavia (*passengers and cargo*).

Glen and Co.; from Glasgow to Holland and Belgium (*cargo*).

Head Line and Lord Line; to Belfast and Dublin, from Petrograd, Reval, Pernau, and Riga (*chiefly cargo*); between Belfast, Dublin, Cork, Londonderry and Hamburg, Amsterdam, Antwerp, Rotterdam and Ghent and Bremen (*chiefly cargo*).

Leeds Shipping Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Leith Hull and Hamburg Steam Packet Co., Ltd.; from Leith to Hamburg *passengers and cargo*); from Glasgow, Grangemouth and Dundee to Hamburg (*cargo*); from Aberdeen and Middlesbro' to Hamburg (*cargo*); from Leith to Bremen (*cargo*); from Leith to Copenhagen (*passengers and cargo*).

Lord Line. *See* Head Line and Lord Line.

Oakwin Steamship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Preston Steam Navigation Co., Ltd.; from East and West Coast Ports of the United Kingdom to Principal Ports of Baltic and Norway (*passengers and cargo*).

Roland-Linie, Aktien Gesellschaft; from Antwerp and Rotterdam, Bremen to Finland, Russia and other East Seaports.

Royal Mail Steam Packet Co.; from Hamburg, Southampton, and Cherbourg to New York (*passengers, mails, and cargo*).

St. Just Steam Ship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Salvesen and Co., Chr.; from Leith to Gothenburg (*cargo*); from Grangemouth to Drontheim, calling at Stavanger, Bergen, Aalesund, and Christiansund (*cargo*).

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Salvesen and Co., J. T.; from Grangemouth to Stockholm and principal Baltic Ports during the season (*cargo*).

Scandia Lines; from Hamburg to London (8-*day freight service*); from London to Gothenburg, Christiania, and Copenhagen (10-*day freight service*).

Stott and Co., Ltd., W. H.; from London and Manchester to principal Scandinavian Ports (*cargo*).

CANADA.

Anchor-Donaldson Line; *Summer service:* Glasgow, Belfast and Liverpool to Quebec and Montreal (*passengers and cargo*). *Note.*—On return voyages the vessels do not call at Liverpool. *Winter service:* Glasgow to St. John, N.B. and Halifax, N.S. (*passengers and cargo*).

Becker and Co., Ltd.; from East and West Coast Ports of the United Kingdom to Quebec (summer), and St. John, N.B. (winter) (*cargo*).

Cairns, Noble and Co., Ltd.; from Calais, Hamburg, Hull, Middlesbro', Leith, and Dundee to Montreal and Portland, Maine (*cargo*); from Mediterranean Fruit Ports to St. John, N.B., and Montreal.

Canada Steamship Lines, Ltd.; from Port Arthur to Chicoutimi, calling at Duluth, Fort William, Sault Ste, Marie, Sarnia, Detroit, Windsor, Port Colborne, Hamilton, Toronto, Rochester, Kingston, Alexandria Bay, Clayton, Brockville, Prescott, Cornwall, Montreal, Sorel, Quebec, Murray Bay, and Tadousac (*passengers and cargo*).

Canadian Government Merchant Marine, Ltd.; Montreal to London (*cargo*); Montreal to Swansea and Cardiff (*cargo*). (During the winter months all these services operate from St. John, N.B.) Vancouver to London and Antwerp (*cargo*); Vancouver to Avonmouth, Birkenhead and Glasgow (*cargo*).

Canadian Pacific Steamships, Ltd. (*passengers, freight, and mails*); from Liverpool, Glasgow, Belfast, Southampton, Antwerp, Cherbourg, Hamburg and Cobh (Queenstown) to Quebec and Montreal in summer, and to Saint John, New Brunswick, in winter (*freight only*); from London, Havre and Bristol to Montreal in summer, and Saint John, New Brunswick, in winter.

Compagnie Général Transatlantique; Havre, Plymouth, and Bordeaux to Atlantic and Pacific Coast Ports (*cargo*).

Cunard Line; from Southampton, Liverpool, London, Belfast, Glasgow, and Cherbourg to Quebec and Montreal (*passengers and cargo*), returning to Liverpool, Plymouth, London or Cherbourg; Southampton, Liverpool, London, Queenstown, Belfast, Cherbourg, Havre and Hamburg to Halifax N.S. (*passengers and cargo*).

Dominion Line; from Bristol and Liverpool to Quebec (summer), and St. John, N.B. (winter) (*passengers and cargo*).

Donaldson Brothers, Ltd. *See* Anchor-Donaldson Line.

Furness Line; from Liverpool to St. John's and Halifax (*passengers and cargo*); from London to Montreal (*cargo*); from London to Halifax (*cargo*); from London to Saint John (*cargo*).

Furness, Withy and Co., Ltd. *See* Furness Line.

Head Line and Lord Line; to Belfast, Cork, Dublin, Hamburg, Londonderry and Rotterdam from Baltimore, Galveston, Montreal, New Orleans, Quebec and St. John, N.B. (*chiefly cargo*).

Holland America Line; from Antwerp, Swansea, Rotterdam to Vancouver and other North Pacific Ports.

Houston Lines; from River Plate; from India and Far East (*both cargo services, carrying a few passengers*).

International Transport Services, Ltd. (County Lines) from Montreal (summer), St. John, N.B. (winter) to Havre, Rotterdam and Hamburg (*cargo only*).

Lord Line. *See* Head Line and Lord Line.

Manchester Liners; Manchester to Quebec and Montreal, St. John (N.B.), Philadelphia, Baltimore and Norfolk (Va.); St. Lawrence, weekly, and Philadelphia service, under normal conditions, fortnightly.

New York, Newfoundland and Halifax S.S. Co., Ltd.; from St. John's, Newfoundland, Halifax, Nova Scotia, and New York (*passengers, mails, and cargo*).

Preston Steam Navigation Co., Ltd.; from East and West Coast Ports of the United Kingdom to Quebec (summer), and St. John, N.B. (winter) (*cargo*).

Royal Mail Steam Packet Co.; from Bermuda, West Indies, and Demerara, British Guiana to St. John, N.B., and Halifax, N.S. (*passengers, mails, and cargo*); from Rotterdam, Antwerp, and London to North Pacific Ports, *viâ* Panama Canal (*passengers, mails, and cargo*); from North Pacific Ports to Glasgow, Liverpool, Southampton, London, Rotterdam, Hamburg and Antwerp.

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White Star Dominion Line; from Liverpool to Quebec and Montreal during summer season; from Liverpool to Halifax and Portland, Me., during winter season (*passengers and cargo*); and from Southampton to Halifax.

NEWFOUNDLAND.

Furness, Withy and Co., Ltd.; from Liverpool to St. John's, Halifax, Nova Scotia, and Boston (*passengers and cargo*).

CHINA AND JAPAN.

Ben Line Steamers, Ltd.; from Antwerp, Leith, London, and Middlesbrough to the Straits Settlements, China, and Japan (*cargo and a few passengers*).

Blue Funnel Line. *See* Holt and Co., Alfred.

British India Line; from Calcutta to Straits, China and Japan (*passengers and cargo*).

Canadian Pacific Railway Co.; from Vancouver to Yokohama, Kobe, Nagasaki, Shanghai, Manila, and Hong Kong (*passengers and cargo*).

China Navigation Co., Ltd.; between Hong Kong and the Chief Ports of China, including Yangtsze Kiang Ports up to Chungking, Indo-China, Siam and Straits Settlements (*passengers and cargo*).

Clan Line; Glasgow and Liverpool to Pacific Islands (*cargo*).

Furness, Withy and Co., Ltd. *See* Prince Line.

Glen Line and Shire Line; from London to Yokohama, calling at Genoa, Port Said, Penang, Port Swettenham, Singapore, Hong Kong, Shanghai, Kobe, and Nagasaki (*passengers and cargo*).

Holt and Co., Alfred; from Liverpool (part loading at Glasgow and Bristol Channel Ports), and from Hamburg, Bremen and Rotterdam to Straits, Philippines, China and Japan (*passengers and cargo*).

Hugo Stinnes Linien; from Hamburg, Bremen, Antwerp, Rotterdam to Port Said, Colombo, Singapore, Hong Kong, Shanghai, Kobe, Yokohama, Tientsien.

Java-China-Japan Lyn; from the Principal Ports of the Netherland East Indies to the Philippine Islands, China and Japan (*passengers and cargo*).

Nippon Yusen Kaisha; from Yokohama, *vid* China, Straits Settlements, Colombo, Suez, and Marseilles to London (*passengers and cargo*).

Osaka Shosen Kaisha; North Continental Ports to China and Japan.

Peninsular and Oriental Line; from London to Straits Settlements, China and Japan (*mails, passengers and cargo*) (fortnightly).

Prince Line; from New York and Norfolk, Va., to Japan, China, Philippines *vid* Panama Canal; from China, Philippines, Java, and Straits Settlements to Boston, New York, Philadelphia, Baltimore *vid* Suez (*cargo*).

Rickmers-Linie; from Antwerp and Hamburg to Singapore, Manila, Hong Kong, Shanghai, Dalny, Kobe, Yokohama, and Vladivostock (*freight*).

Shire Line. *See* Glen Line and Shire Line.

Wilh. Wilhelmsen; from Norway, Sweden, Denmark, Finland, Hamburg, and Antwerp to principal ports of China and Japan (*cargo*).

FRANCE (NORTHERN), BELGIUM, ETC.

American-Hawaiian Steamship Co.; from Los Angeles, Portland, San Francisco, Seattle, and Tacoma to Antwerp, Hamburg, and Havre, calling at Glasgow, Liverpool, and London (*fortnightly cargo services*).

Bennett Line; from Goole and London to Amsterdam, Rotterdam, Calais, Dunkirk, and Hamburg (*cargo*).

Bristol Steam Navigation Co., Ltd.; from Bristol, Plymouth, Swansea and Gloucester to Amsterdam, Rotterdam, and Antwerp, and from Hamburg to Gloucester (*cargo*).

British Rhineland Navigation and Transport Co., Ltd. *See* Neptune Line.

Brussels Steamship Co., Ltd.; from London to Brussels (*cargo*).

Burnham Shipping Co., Ltd.; from Cardiff to Antwerp, Rotterdam, and Hamburg (*cargo*).

Burton, Smart and Orford, Ltd. *See* Neptune Line; and Smart's Continental Line.

Compagnie Générale Transatlantique; from London to Bordeaux, Nantes, and La Pallice (*passengers and cargo*).

Constantine (R. A.) and Donkin, Ltd; from Middlesbrough to Calais, Havre, Antwerp, Rotterdam, and Amsterdam (*passengers and cargo*).

Cork Steam Ship Co., Ltd.; from Liverpool, Manchester, and Southampton to Amsterdam, Rotterdam, Dunkirk, Antwerp, and Ghent; from Glasgow to Antwerp and Ghent; from Belfast to Ghent (*cargo and passengers*).

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Cunard Line; from Liverpool, Manchester, Glasgow, and Swansea to Havre, St. Malo and Dieppe (*cargo*).
Dens and Co., Ltd.; from London to Havre (*cargo*).
Ellerman and Bucknall Steamship Co., Ltd.; from Australia.
Ensign Shipping Co., Ltd.; from Hull and London to Amsterdam, Rotterdam, and Hamburg (*cargo*).
General Steam Navigation Co., Ltd.; from East Coast Ports of England to Hamburg, Amsterdam, Rotterdam, Harlingen, Ostend, Ghent, Antwerp, Dunkirk, Havre, Charente (*cargo*); Bordeaux (*passengers and cargo*).
Gibson and Co., Ltd., George; from Leith, Grangemouth, Dundee and Aberdeen to Antwerp, Rotterdam, Amsterdam, Hamburg, Rouen, Dunkirk and Ghent (*cargo*).
Great Western Railway; from Fishguard and Weymouth to Waterford, Rosslare, Guernsey and Jersey (*passengers and cargo*).
Head Line and Lord Line; Belfast, Cork, Dublin, and Londonderry to and from Amsterdam, Antwerp, Dunkirk, Hamburg, Ghent, Bremen, and Rotterdam (*chiefly cargo*).
Holland Steamship Co., Ltd.; from London to Dutch Ports (*passengers and cargo*).
Hull and Netherlands Steamship Co., Ltd.; from Hull to Rotterdam, Amsterdam and Harlingen (*passengers and cargo*).
Hutchinson, Ltd., J. P.; from West Coast Ports of England to Rouen, Nantes, Bordeaux and Hamburg (*cargo*).
Kaye, Son and Co., Ltd.; from London to North French Ports (*cargo*).
Lancashire and Yorkshire Railway; from Hull to Dutch Ports (*passengers and cargo*).
Limerick Steamship Co., Ltd.; from Limerick and Cork to Dunkirk, Calais, Havre, Rotterdam, Amsterdam, and Antwerp (*passengers and cargo*).
London and North-Eastern Railway (Great Central Section); from Grimsby to Antwerp, Hamburg and Rotterdam (*passengers and cargo*). (Great Eastern Section); from Harwich to Hook of Holland, Antwerp and Rotterdam (*cargo only*); from Harwich to Zeebrugge (*passengers—summer season only*).
Lord Line. *See* Head Line and Lord Line.
Marine Mercantile Co., Ltd.; from East Coast Ports of England to Rotterdam, Antwerp, Amsterdam, and Havre (*cargo*).
Neptune Line; from London to Rotterdam, Cologne, and other Rhine Ports (*bi-weekly freight service*); from Hull, Goole, King's Lynn, and other U.K. Ports to Rotterdam, Cologne, and other Rhine Ports (*weekly freight service*).
Ocean Belgian Steam Navigation Co., Ltd. *See* Dens and Co.
Park, Ltd., R. and J.; from London to North French Ports (*cargo*).
Rankin and Son, James; from Leith and Grangemouth to Dutch Ports (*cargo*).
Roland-Linie, Aktien Gesellschaft; from Hamburg and Bremen to England (different lines).
Royal Mail Steam Packet Co.; from Liverpool and Southampton to French, Spanish, and Portuguese Ports to Madeira, Las Palmas, Teneriffe, St. Vincent (C.V.), Brazil, Uruguay, and Argentina (*passengers, mails, and cargo*); Southampton and Cherbourg to New York (*passengers, mails, and cargo*).
Smart's Continental Lines; from London to Antwerp, Boulogne, Havre, and Rouen (*bi-weekly freight service*).
Walford Lines, Ltd.; from U.K. Ports to France, Belgium and Holland.
Wilsons and N.E.R. Shipping Co., Ltd.; from Hull to Dunkirk, Ghent, Antwerp and Hamburg.
Zeeland Steamship Co., Netherland's Royal Mail Line; from Folkestone to Flushing (*daily day service, mails, cargo and passengers*).

INDIA, BURMAH AND CEYLON.

Anchor Line; Glasgow and Liverpool to Gibraltar, Port Said, Suez and Bombay (*fortnightly, passengers and cargo*). *Note.*—On the return voyage the vessels call at Marseilles in addition.
Anchor-Brocklebank and Well Lines; Glasgow and Liverpool to Calcutta direct (*cargo*); Hamburg, Rotterdam, Antwerp, Middlesbro' and London to Port Said, Colombo, Madras and Calcutta (*cargo*).
Anderson, Green and Co., Ltd. *See* Orient Line.
Asiatic Steam Navigation Co., Ltd.; from Calcutta to Chittagong and Rangoon; from Calcutta to Rangoon and Moulmein; from Calcutta to Bombay *vid* Ceylon, calling at Coast Ports; from Calcutta, Rangoon, and Madras to Port Blair (Andaman Islands) (*mails and passengers in all cases*).
Bibby Line; from Liverpool and London to Marseilles, Port Said, Port Sudan, Colombo and Rangoon (*passengers and cargo*).

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Blue Funnel Line. *See* Holt and Co., Alfred.
Bombay and Persia Steamship Steam Navigation Co.; between Indian and Red Sea Ports and Persian Gulf.
British India Line; from London and Middlesbrough to Calcutta, Bombay, and Madras (*passengers and cargo*); coasting to all principal Ports in Japan, China, Straits, India, Burma, Ceylon, and Persian Gulf from Calcutta and/or Bombay (*passengers and cargo*).
City Line; from Glasgow and Liverpool to Principal Ports of India (*passengers and cargo*).
Clan Line; from Glasgow, Liverpool to Colombo, Calcutta, Madras, Chittagong, Bombay, Malabar Coast (*cargo*).
Ellerman and Bucknall Steamship Co., Ltd.; New York and U.S.A. Atlantic Ports to Indian Ports (*passengers and cargo services*).
Ellerman and Bucknall Steamship Co., Ltd.; from New York (*regular passenger and cargo services*).
Ellerman and Bucknall Steamship Co., Ltd.; United Kingdom and Continental Ports to Persian Gulf (*regular cargo service*).
Hall Line; outward services: from Liverpool to Bombay and Karachi, *vid* Suez Canal (*passengers and cargo*); from Liverpool to Marmagao and Malabar Coast Ports, calling at Lisbon, Bombay, and for Karachi (*passengers and cargo*): these vessels sometimes load at Newport, Glasgow, and Manchester and occasionally call at Marseilles and Naples. Homeward services: from Bombay to Marseilles and Liverpool (*passengers and cargo*); from Karachi to Marseilles and Liverpool (*passengers and cargo*); from Madras Coast to Marseilles, London, and Liverpool (*cargo*); from Malabar Coast to Marseilles, London and Liverpool (*cargo*); from Rangoon to Marseilles and Liverpool (*cargo*); from Rangoon to Alexandria and Liverpool (*cargo*); from Colombo to Marseilles, London, and Liverpool (*cargo*)
Hamburg-Amerika Linie; Hamburg to the Far East (Line A, weekly; Line B, fortnightly).
Harrison Line; from Liverpool, Newport and Swansea to Calcutta (*cargo*).
Henderson and Co.; from Glasgow and Liverpool to Calcutta and Madras (*cargo*).
Holland, British India Line; from Hamburg, Antwerp, Rotterdam to Principal Ports on the East and West Coast of Inda. Alse to Rangoon (Burmah), Colombo (Ceylon).
Holt and Co., Alfred; from Colombo to Liverpool (*passengers and cargo*), not calling at Colombo outwards.
Houston Line: from Canada (*cargo services, carrying a few passengers*).
Mogul Steamship Co.; from Birkenhead to Calcutta (*cargo*).
Orient Line (Mail Steamers); from Tilbury the vessels call at Colombo, on their way to Australia, and also on the return voyage (*passengers, cargo, and mails for Commonwealth of Australia*).
Peninsular and Oriental Line; from London and Marseilles to Bombay and Colombo, calling at Port Said and Aden (*mails, passengers, and cargo*) (weekly); from London to Colombo and Calcutta, calling at Malta (occasionally), Port Said and Aden (*passengers and cargo*) (usually fortnightly).
Topham, Jones and Railton, Ltd.; from London to Calcutta, Madras, Bombay, and Colombo (*cargo*)
Turner and Co. *See* Asiatic Steam Navigation Co., Ltd.
Wilh. Wilhelmsen; from Norway, Sweden, Denmark, Finland, Hamburg and Antwerp to Principal Ports of India and Ceylon (*cargo*).

THE MEDITERRANEAN, PORTUGAL, AND SPAIN.

African Steamship Co.; from Liverpool to principal Mediterranean Ports (*passengers and cargo*).
Anchor Line; Cruises—round the World: Glasgow—New York to West Indies; Glasgow—New York to Mediterranean.
Anderson, Green and Co., Ltd. *See* Orient Line.
Armstrong, Lord and Co.; from Ports on East Coast of United Kingdom to principal Mediterranean Ports (*cargo*).
"Artus" Line. *See* Hugo Stinnes Linie.
Bibby Line; from Liverpool and London to principal Mediterranean Ports (*passengers and cargo*).
Bland Line; from Gibraltar to Tangier and Casablanca (*mail, passenger and cargo service*) weekly; to Melilla and Oran, fortnightly; to Ceuta, Tetuan, Larache, Kehitra, Rabat, Mazagan, Saffi and Mogador (*passenger and cargo service*).

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British India Line; from London and Middlesbrough to principal Mediterranean Ports (*passengers and cargo*).
Burnham Shipping Co., Ltd.; from Cardiff to Marseilles, Algiers, Tangier, and Gibraltar (*passengers and cargo*).
Compagnie des Messageries Maritimes; from Port St. Louis to Marseilles, Bizerta, Alexandria, Port Said, Beyrouth, Tripoli, Caiffa, and Jaffa (*cargo*).
Compagnie Générale Transatlantique, Ltd.; Marseilles to Algiers, Tunis, Oran, Philippeville, Bona and Bizerta (*passengers, cargo, and mails*).
Compagnie Havraise Péninsulaire de Navigation à Vapeur; from Havre, Dunkirk, and Rouen to Algeria (*passengers and cargo*).
Compañia Transatlantica (Royal Mail Line of Steamers); from Liverpool to Barcelona, Cadiz, Corunna, Cartagena, Lisbon, Azores, and Vigo (*passenger, freight, and mails*).
Compañia Transmediterránea; from Cadiz to Canary Islands; from Algeciras to Ceuta; from Algeciras and Cadiz to Tangier (*passengers, cargo and mails*).
Cunard Line; from Liverpool, Manchester and Swansea to Gibraltar, Genoa, Leghorn, Naples, Palermo, Messina, Catania, Corfu, Brindisi, Bari, Gruz, Ancona, Venice, Trieste and Fiume; from Liverpool, Manchester, Glasgow and Swansea to Gibraltar, Oran, Algiers, Malta, Patras, Piræus, Syra, Volo, Salonica, Smyrna, Constantinople, Bourgas, Varna, Canstanza, Sulina (*cargo*).
Davies Steamship Co., W. R.: from U.K. Ports (*cargo*).
Dens and Co., Ltd.; from Newcastle-on-Tyne to principal Mediterranean Ports.
Deutsche Ost-Afrika Linie; from Hamburg, Antwerp, and Southampton to Chief West African Ports (*passengers and cargo*).
Dickinson and Co., Ltd., William; from the Tyne to principal Mediterranean Ports (*cargo*).
Ellerman and Bucknall Steamship Co., Ltd.; from New York (*regular cargo services*) to principal Mediterranean, Levant, and Black Sea Ports.
Ellerman's Wilson Line; from Hull to Tangier and Algiers (*passengers and cargo*).
Furness Line; from New York to Piræus, Patras, Salonica, Constantinople, Bulgarian and Danube Ports, Smyrna and Alexandria (*cargo*).
Furness, Withy and Co., Ltd. *See* Furness Line, Johnston Line, and Prince Line.
General Steam Navigation Co., Ltd.; from London to Oporto, West Italian and Sicilian Ports (*cargo*).
Glen Line and Shire Line; from London to Yokohama, calling, at Genoa and Port Said (*passengers and cargo*).
Glynn and Co., Ltd.; from Liverpool to principal Mediterranean Ports (*cargo*).
Golden Cross Line; from Bristol, Cardiff, Liverpool, and Swansea to principal Mediterranean Ports (*cargo*).
Hall Line; from Glasgow and Liverpool to Aden, Mombasa, Kilnidini, Zanzibar, and ports of Madagascar and Portuguese East Africa, calling at Lisbon, Port Said, and Port Sudan (*cargo*); Beira and other East African Ports to Marseilles and Liverpool (*cargo*); Aden to Marseilles and Liverpool (*cargo*); Port Sudan to Marseilles and Liverpool (*cargo*).
Hamburg-Amerika Linie (Afrika-Dienst); from Hamburg, Antwerp and Southampton to Peninsular and Mediterranean Ports (*passengers and cargo*).
Hamburg-Bremer Afrika-Linie A.-G.; from Hamburg, Antwerp and Southampton to Peninsular and Mediterranean Ports (*passengers and cargo*).
Hogarth and Sons; from Glasgow to principal Mediterranean Ports (*cargo*).
Hugo Stinnes Linien; from Hamburg to Portuguese Ports, Pernambuco, Monte Video, Buenos Aires, and Rosario (in association with the "Artus" Line, Danzig) (*passengers and cargo*).
Johnston Line; from Antwerp, Swansea, and Liverpool to Piræus, Syria, Volo, Salonica, Smyrna, Constantinople, Bourgas, Varna, Constanza, Sulina, Galatz, and Braila (*cargo*).
Koninklijke Hollandsche Lloyd; from Antwerp to Buenos Aires, calling *en route* at Southampton, Cherbourg, La Corma, Vigo, Leixoes, Lisbon, Las Palmas, Pernambuco, Bahia, Rio de Janeiro, Santos, and Monte Video (*passengers, mails, and cargo*).
Koninklijke Nederlandsche Stoomboot Maatschappij; from Amsterdam, Rotterdam to Principal Mediterranean Ports (*cargo and passengers*).
McAndrews and Co., Ltd.; from London, Liverpool, Glasgow, Hull, Swansea, Antwerp, and Hamburg to Lisbon, Gibraltar and the Principal Ports of Spain (*cargo and a few passengers*).
Moss Line; from Liverpool, Glasgow, and Swansea to Alexandria, calling at Gibraltar, Algiers, and Malta; from Liverpool, Glasgow, and Swansea to Constantinople, calling at Gibraltar, Oran, Malta, Syra, Smyrna, Salonica, Piraeus and Volo; from Liverpool, Glasgow, and Swansea to Beyrouth, calling at Casa-

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blanca, Gibraltar, Malta, Famagusta, Larnaca, Sarnaca, Alexandretta, Haifa, Jaffa, and Port Said; from Liverpool to Bordeaux; from Liverpool, Galsgow, and Swansea to Casablanca and all Moroccan Ports (*all cargo services*).

Nelson, Ltd., H. and W.; from London to Buenos Aires, calling on the outward journey at Boulogne, Corunna, Vigo, Las Palmas G.C., Rio de Janeiro, and Monte Video, and on the homeward journey at Monte Video and Las Palmas; from Liverpool to Buenos Aires, calling at Monte Video, and at Las Palmas on the homeward voyage (*cargo, passengers, and mails*).

Ocean Belgian Steam Navigation Co., Ltd. *See* Dens and Co.

Orient Line (Mail Steamers); from Tilbury to Colombo, Fremantle, Adelaide, Melbourne, Sydney, and Brisbane, calling at Gibraltar, Toulon, Naples, and Port Said. On the homeward voyage the vessels call at Plymouth (*passengers, cargo, and mails for Commonwealth of Australia*).

Papayanni Line; from Liverpool to principal Mediterranean Ports (*passengers and cargo*).

Peninsular and Oriental Line; from London to Gibraltar and Marseilles (*passengers, mails, and cargo*) (weekly).

Power and Co., J.; from London to principal Mediterranean Ports (*cargo*).

Prince Line, Ltd.; from Leith, Tyne, Middlesbrough, Antwerp, and London to Malta, Alexandria, Palestine, Syria, Asia Minor and Cyprus (*cargo and passengers*); from Manchester to Tunis, Malta, Alexandria, Palestine, Syria, Asia Minor and Cyprus, with homeward services to Liverpool and Manchester (*cargo and passengers*).

Roland-Linie, Aktien Gesellschaft; from Bremen to the Canary Islands.

Roland-Linie, Aktien Gesellschaft; from Bremen to Mediterranean Ports.

Rotterdam-Zuid-Amerika Lijn; from Antwerp, Rotterdam, and Hamburg to Buenos Aires, Monte Video, Santos, Rio de Janeiro, Bahia, and Pernambuco, calling at Bilbao, Santandar, and Vigo (*cargo, carrying a few passengers*).

Royal Mail Steam Packet Co., from London to Lisbon (*cargo only*); from Swansea to Lisbon and Algave Ports (*cargo only*); from Southampton and Liverpool to French, Spanish, and Portuguese Ports, Las Palmas, Teneriffe, St. Vincent (C.V.), Brazil, Uruguay, and Argentina (*passengers, mails, and cargo*).

Shire Line. *See* Glen Line and Shire Line.

Sloman (Rob. M. Jun.) Mittelmeer-Linie; from Hamburg to Spain and chief Mediterranean Ports (*passengers and cargo*).

Sota y Aznar; from Glasgow, Liverpool, and Swansea to Spanish Ports (*cargo*) (outwards only).

Stinnes Linien. *See* Hugo Stinnes Linien.

Strick and Co., Ltd., Frank C.; from Antwerp, London, Glasgow, and Manchester to Port Said, Aden, Bandar Abbas, Bushire, Mohammarah, Basrah, Ahway, and Bagdad (*cargo, also passengers in certain ships*).

Union-Castle Line; from London to Gibraltar, Marseilles, Genoa, Naples, Port Said, Suez, Port Sudan, and Aden to East African Ports (*passengers, mails, and cargo*).

Westcott and Laurance Line, Ltd.; from Leith, Tyne, Antwerp, and London to Gibraltar, Malta, Alexandria, Piraeus, Salonica, Smyrna, Constantinople, Bulgarian and Danubian Ports (*cargo and passengers*).

White Star Line; from New York and Boston to Genoa, calling at Azores, Gibraltar, and Naples (*passengers and cargo*).

Woermann-Linie A.G.; from Hamburg, Antwerp and Southampton to Peninsular and Mediterranean Ports (*passengers and cargo*).

Yeoward Line; from Liverpool to Lisbon, Madeira, and Canary Islands (*passengers and cargo*).

STRAITS SETTLEMENTS AND EAST INDIES.

Asiatic Steam Navigation Co., Ltd.; from Indian Ports to Principal Ports of Java (*mails and passengers*).

Ben Line of Steamers, Ltd.; from Antwerp, Leith, London, and Middlesbrough to Chief Ports of Straits Settlements, China, and Japan (*cargo and a few passengers*).

Blue Funnel Line. *See* Holt and Co., Alfred.

British India Line; from Calcutta to Singapore (*mails, passengers, and cargo*).

Compañia Transatlantica; from Liverpool to Singapore, Philippines, Manila, Ilvilo, Cebu, Cavite, and Zamboanga (*passengers, mails, and freight*).

Ellerman and Bucknall Steamship Co., Ltd.; from New York and Gulf Ports (*fortnightly cargo service*); from German, French and Dutch Ports (*monthly cargo service, also passenger sailings*); from Australia and Java to Straits Settlements (*regular cargo and passenger services*); from Canada to Java (*monthly cargo service*).

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Furness, Withy and Co., Ltd. *See* Prince Line.
Glen Line and Shire Line; from London to Yokohama, calling at Genoa, Port Said, Penang, Port Swettenham, Singapore, Hong Kong, Shanghai, Kobe, and Nagasaki (*passengers and cargo*).
Holt and Co., Alfred; from Hamburg, Amsterdam, and Liverpool to the Dutch East Indies; from New York to the Dutch East Indies; from Singapore to Sumatra; from West Australia to Singapore (*passengers and cargo*).
Huddart Parker, Ltd.; from Sydney, Auckland and Wellington (*mails, passengers, and cargo*).
"Konferenz-Linie"; from Bremen, Hamburg, Antwerp, and Rotterdam to Singapore and principal ports of the Far East (*passengers and cargo*).
Osaka Shosen Kaisha; from Antwerp, Rotterdam, Hamburg and Port Said to Singapore, Hongkong, Shanghai, Dairen, Kobe, Osaka and Yokahama, returning Yokohama, Kobe, Dairen, Shanghai, Hongkong, Singapore, Colombo, Aden, Port Sudan, Port Said, London, Hamburg, Rotterdam, Antwerp.
Parker, Ltd., Huddart. *See* Huddart Parker, Ltd.
Peninsular and Oriental Line; from London and Marseilles to the Straits Settlements, China, and Japan, *viâ* Port Said, Aden, and Colombo (*mails, passengers, and cargo*) (fortnightly).
Prince Line; from New York and Norfolk, Va., to Japan, China, and Philippines *viâ* Panama Canal; from China, Philippines, Java, and Straits Settlements to Boston New York Philadelphia and Baltimore *viâ* Suez (*cargo*).
Rickmers-Linie; from Antwerp and Hamburg to Singapore, Hong Kong, Shanghai, Kobe, Yokohama, and Vladivostock (*freight*).
Shire Line. *See* Glen Line and Shire Line.
Stinnes Linien, Hugo. *See* "Konferenz-Linie."
Stoomvaart Maatschappij "Nederland"; from Amsterdam, Southampton, and Genoa to Egypt, Colombo, Singapore, and Dutch East Indies (*passengers and cargo*).
Thomson and Co. *See* Ben Line of Steamers, Ltd.
Turner and Co. *See* Asiatic Steam Navigation Co.
Union Steam Ship Co. of New Zealand, Ltd.; from Vancouver, Auckland, Suva (Fiji), and Honolulu to Sydney; from San Francisco, Wellington, Rarotonga (Cook Is.), and Papeete (Tahiti) to Sydney (*mails, passengers, and cargo*).
Weir and Co., Andrew; from Cape Town, Mossel Bay, Port Elizabeth, East London, Durban, Delagoa Bay, and Mauritius to Singapore, Bangkok, and Hong Kong (*passengers and cargo*).
Wilh. Wilhelmsen; from Norway, Sweden, Denmark, Finland, Hamburg, and Antwerp to the chief ports of the Straits Settlements, China, and Japan (*cargo*).

UNITED STATES OF AMERICA.

American Hawaiian Steamship Co.; from Antwerp, Glasgow, Hamburg, Havre, Liverpool, and London to Portland, Los Angeles, San Francisco, Seattle, and Tacoma (*fortnightly cargo sailings*).
American Line; from Hamburg to New York (*passengers and cargo*).
Anchor Line; Glasgow and Moville to New York; Glasgow to Boston (*passengers and cargo*).
Atlantic Transport Co. of West Virginia; from London to New York (*passengers and cargo*).
Atlantic Transport Line; from London to New York (*passengers and cargo*); from London to Philadelphia, Baltimore, and Norfolk (*cargo only*).
Blue Funnel Line. *See* Holt and Co., Alfred.
Bristol City Line of Steamships, Ltd.; from Bristol and Swansea to New York and Baltimore (*passengers and cargo*).
Cairns, Noble and Co., Ltd.; from Calais, Hamburg, Hull, Middlesbro', Leith, and Dundee to Portland (Maine) (*cargo*).
Canadian Pacific Railway Co.; from Vancouver to Victoria, Nanaimo, Albert Bay, Prince Rupert, Ketchikan, Wrangel, Juneau, Skagway (*passengers and cargo*); from Vancouver to Seattle, *viâ* Victoria (*passengers and cargo*).
Castle Line; from Antwerp, Hull, and London to Galveston and Houston (*carrying a few passengers*).
Clyde Steamship Co.; from New York to Jacksonville (*cargo and passengers*); from Jacksonville to Sanford Enterprise, calling at Palatka, Astor, Deland, and Orange City (*cargo and passengers*); from New York to Wilmington (*cargo*); between Boston, Charleston, and Jacksonville (*cargo*).
Clyde Steamship Co.; from New York to Miami (*cargo and passengers*); from Jacksonville to Miami (*cargo*).

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Compagnie Générale Transatlantique; from Plymouth and Havre to New York (*passengers and cargo*); Bordeaux to New York.

Cornborough Shipping Line, Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Cunard Line; from Southampton, Liverpool, Queenstown, Cherbourg, Havre, and Hamburg to New York (*passengers and cargo*); to Southampton, Plymouth, Liverpool, Queenstown, Cherbourg and Havre, eastbound; Liverpool and Queenstown to Boston (*passengers and cargo*); London to New York, Boston, Baltimore, and Philadelphia (*cargo*).

Dalgleish Ltd., R. S.; from Liverpool to Galveston, New York and Newport News (*cargo*).

Donaldson Line; from Glasgow to Baltimore; from Glasgow to Newport News, Va.; from Glasgow and Liverpool to Savannah, Ga. (*cargo service only*).

Ellerman and Bucknall Steamship Co., Ltd.; Manchester to New York (*monthly cargo service*); from United Kingdom and Continent to Pacific Ports (*monthly cargo service*).

Ellerman's Wilson Line; from Antwerp to New York; from Hull to New York; from Newcastle to New York (*cargo*).

Furness Line; from Liverpool to Newport News and Norfolk (*cargo*); from Glasgow to Philadelphia (*cargo*); from Glasgow to Boston (*cargo*); from Leith and Dundee to New York (*cargo*); from Leith and Dundee to Philadelphia (*cargo*); from Liverpool to Boston (*passengers and cargo*); from Liverpool, Glasgow and Manchester *viâ* Panama Canal to Los Angeles and San Francisco, thence to Victoria and Vancouver (*passengers and cargo*).

Furness Philadelphia Transatlantic Line; London to Philadelphia and New York *cargo and passengers*).

Furness, Withy and Co., Ltd. *See* Furness-Prince Line, Prince Line, Johnston Line, Warren Line, and Furness Philadelphia Trans-Atlantic Line.

Furness, Withy and Co., Ltd., Newfoundland; from Liverpool to St. John's (*passengers and cargo*).

Hamburg-Amerika Line; Hamburg to New York (*freight and passengers*); from Hamburg to Boston and New York (*freight and passengers*); from Hamburg to Philadelphia, Baltimore and Norfolk (*freight*).

Hamburg-Amerika Linie; Hamburg to West Coast Ports of North America (*freight*).

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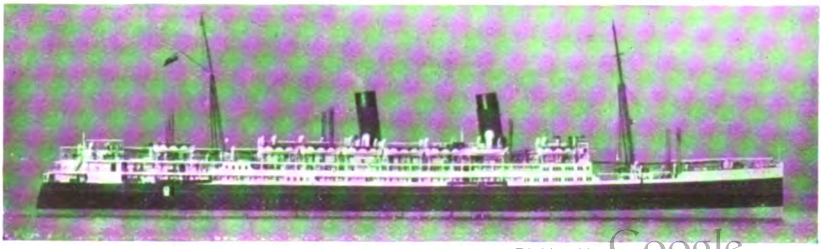
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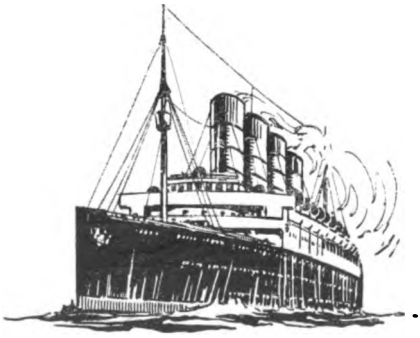
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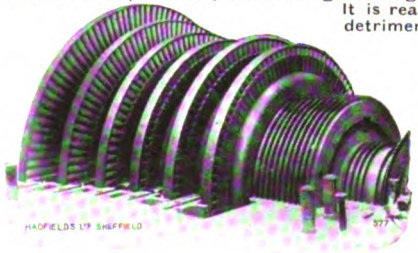
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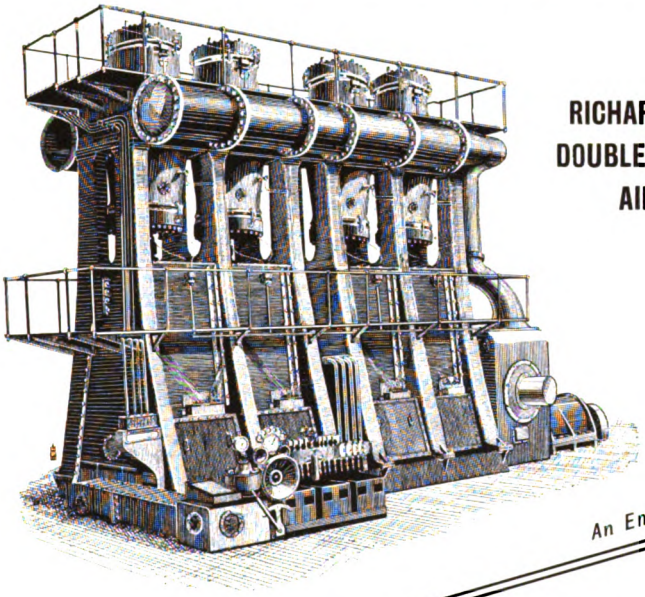
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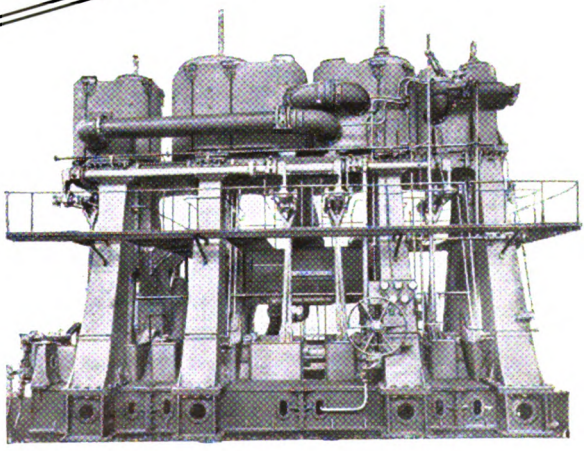
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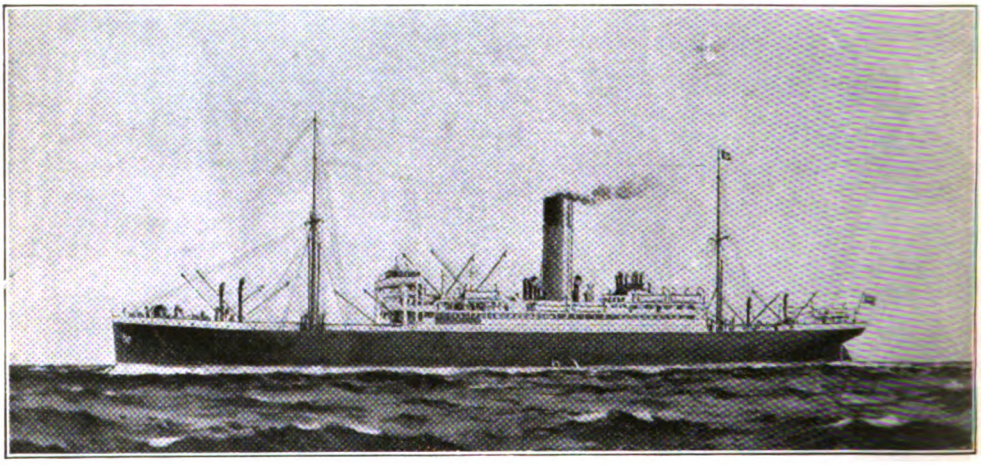
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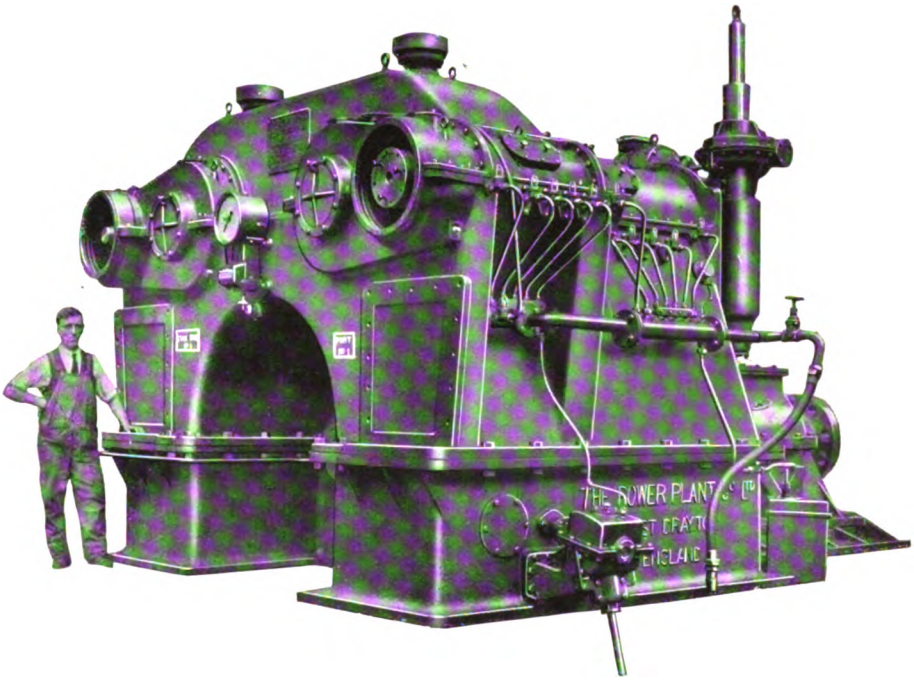
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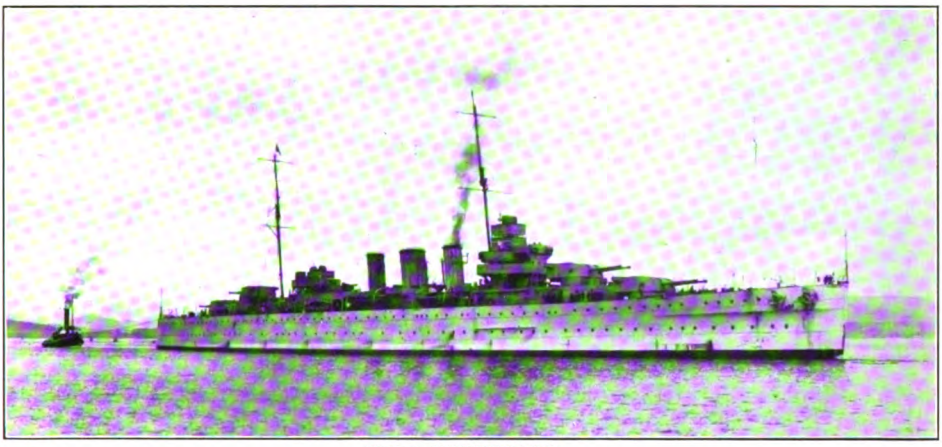
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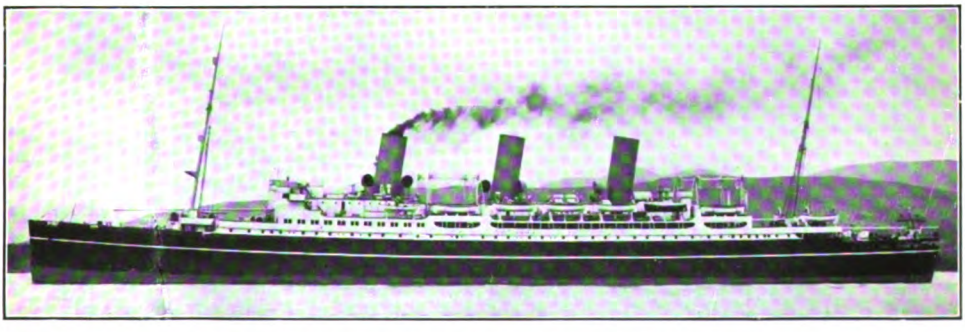
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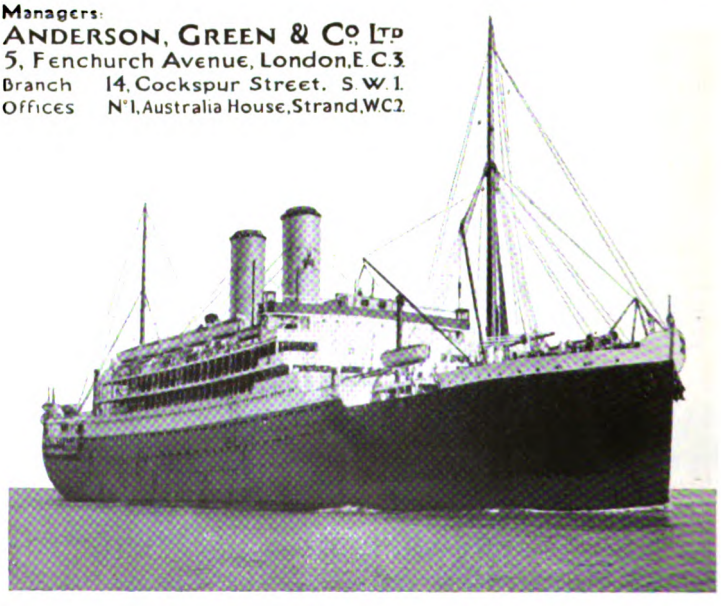
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b. battleship; *b.cr.* battle cruiser; *cr.* cruiser; *a.cr.* armoured cruiser; *air.c.* aircraft carrier; *f.l.* flotilla leader; *l.cr.* light cruiser; *s.cr.* scout cruiser; *s.cl.cr.* second-class cruiser; *d.* destroyer; *t.b.d.* torpedo-boat destroyer; *c.d.* coast defence ship.

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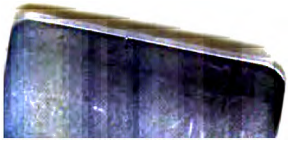
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